ENGLISH EDITION

The VILLAGER'S' CALENDAR

1935

MADRAS
AGRICULTURAL DEPARTMENT

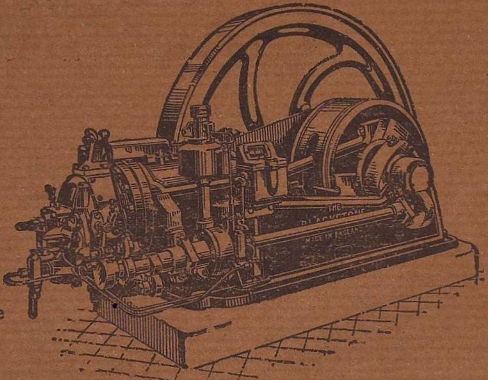
Price 1 anna: Postage 2 annas

Apply to the nearest Agricultural Officer. Not sent by V.P.P.

BLACKSTONE "SPRING INJECTION" COLD STARTING CRUDE OIL ENGINES

WITH ONE OR TWO FLY-WHEELS AS REQUIRED

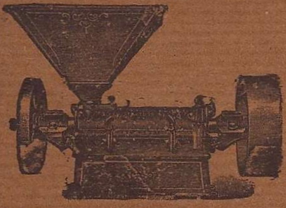
The Latest and Best Obtainable



Unequalled for Economy and Reliability

WE CAN ALSO SUPPLY SMALL 1¼ TO 2 B.H.P. PETROL ENGINES, 2¼ TO 6 B.H.P. NO-TROUBLE VERTICAL FOUR-STROKE KEROSENE OIL ENGINES AND 5 TO 14 B.H.P. HOPPER COOLED COLD STARTING CRUDE OIL ENGINES

If you wish to irrigate your lands most economically specify the well-known Marshall pumping sets.



All sizes of Genuine Engelberg Rice Hullers can only be had from us, as we are the sole agents for India.

The most efficient Invincible Centrifugal Pumps for all duties can be quoted for on request

Pump Catalogue will be sent on application.

MARSHALL SONS & Co. (India), Ltd., MADRAS.

Branches: BEZWADA, TANJORE, COIMBATORE

To ensure prompt attention refer to the Villagers' Calendar.

E-UN-16

PARRY'S

HAVE A : : : :

COMPLETE FERTILISER

FOR EACH CROP

PADDY, COTTON
RAGI, POTATOES
SUGARCANE
VEGETABLE
FRUIT TREES, Etc.

PRICES *and* PARTICULARS *from*

PARRY & CO. LTD.

BOX 12, MADRAS

Whatever the CROP is

STANES

can supply the **MANURE**
to make it a **BUMPER** Crop

T. STANES & CO. LTD.

FERTILISER SPECIALISTS

COIMBATORE

South Indian Railway Co., Ltd.

(Incorporated in England.)

Buy Coupon Ticket Books and Travel Cheaply.

MERCHANTS and others who travel for business or pleasure, especially people wishing to visit places of religious and historic interest on the S.I. Ry. should buy First and Second-class Coupon Books.

First and Second-class Mileage Coupon Books for 1,500 miles and 3,000 miles available for three and six months, respectively, in local booking over this Railway (Nilgiri and Shoranur-Nilambur Railways excepted) will be issued at the following fares :—

	For 1,500 miles valid for 3 months.	*For 3,000 miles valid for 6 months.*
First class	Rs. 115	Rs. 230
Second class	,, 58	,, 115

2. (*a*) The Coupon Books are available in local booking only over the S.I.Ry. (Nilgiri and Shoranur-Nilambur Railways excepted).

(*b*) The Coupons are also valid for the issue of through first and second-class tickets :—

(i) To Madras Central Station or *vice versa* by the S.I Ry. running power trains, viz., the Malabar and Blue Mountains Expresses. For journeys to Madras Central through tickets are issued on collection of S.I.Ry. Coupons for the entire distance over the S.I and M. & S.M Railways and for journeys from Madras Central full tariff fares in cash for the M. & S.M. portion of journey from Madras to Jalarpet and S.I.Ry. Coupon from Jalarpet to stations on the S.I.Ry. are collected.

(ii) To Bangalore City and Cantonment stations or *vice versa* on collection of S.I.Ry. Coupons for the S.I.Ry. portion of journey and tariff fares in cash for the M. & S.M portion of journey from Jalarpet to Bangalore. The tickets so issued are available for travel only by Nos. 7 and 8 Madras-Bangalore Mail trains on the M. & S.M. Ry.

3. These Coupons are available for use by any person whose business necessitates frequent travel. Coupon books issued to persons other than mercantile firms are valid for use only by the purchaser and one female relation if she travels by the same train as the holder of the coupon book ; and coupons and tickets are not transferable.

Detached Coupons are not accepted in lieu of fares.

4. Examples of savings effected by passengers in using these coupons :

Miles.	First class. Tariff fare by all trains.			First class. Coupon ticket fare by all trains.			Second class. Tariff fare by Express trains.			Second class. Coupon ticket fare by all trains.		
	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
100	9	6	0	7	10	8	6	4	0	3	13	10
200	18	0	0	15	5	4	11	12	0	7	11	8
300	25	13	0	23	0	0	16	7	0	11	9	7
400	33	10	0	30	10	8	21	2	0	15	7	5
500	41	7	0	38	5	4	25	13	0	19	5	4

For details, conditions, etc., enquire at stations, see posters at stations or apply to the Chief Commercial Superintendent or District Traffic Superintendents for leaflets.

South Indian Railway Co., Ltd.

(Incorporated in England.)

Transport of Goods in Containers.

1. Containers can be used for the carriage of all descriptions of goods traffic, except explosives, dangerous and offensive goods between the following stations :—

Madras Egmore.	Pollachi Jn.	Erode Jn.	Shoranur Jn.
Villupuram Jn.	Tuticorin.	Mangalore.	Olavakkot Jn.
Arkonam Jn.	Quilon.	Azhikkal.	Palghat.
Trichinopoly Goods.	Mettupalaiyam.	Tellicherry.	Shencottah.
Tanjore Jn.	Coimbatore.	Calicut.	Nilambur Road.
Madura Jn.	Podanur.	Kallayi.	Morappur.
Udamalpet.	Singanallur.	Ferok.	

2. Each Container measures 4 ft. 9 in. × 5 ft. $9\frac{3}{4}$ in. × 6 ft. 9-1/16 in. (height) and is of 152 cubic feet capacity, and is capable of carrying a net weight of 2 tons. The gross weight when loaded with medium weight merchandise is about $2\frac{3}{4}$ tons.

3. These Containers are water-tight, pilferage is impossible, and the handling and breakage of goods at tranship stations, where there is a break of gauge, is avoided. Six Containers can be loaded in a Broad Gauge and three in a Metre Gauge Container truck.

4. Articles such as paper packets of tea and cigarettes, hardware, glassware, tins of coffee and other miscellaneous articles can be put into a Container, and the cost of packing is avoided.

5. A small uniform charge of 5 per cent in excess of the tariff rates is levied for the use of Containers subject to a minimum weight for charge of 27 maunds for a Container.

6. If goods are booked at owner's risk rates, risk notes should be executed.

7. As fixed cranes have not been provided at Palghat and Salem Market for transhipment of goods, goods traffic in Containers cannot be booked via these junctions but will be booked by the next shortest route via the junctions at which fixed cranes have been provided and will be charged at the cheapest rate in force by any route, provided the Government minima are not infringed.

8. Containers are lifted by cranes from wagon to wagon and between wagons and lorries. No cranage or transhipment charge is levied.

9. The procedure for rounding off fractions of a pie is as shown in *paragraph* 72, *page* 69 *of Goods Tariff, Part* 1, *No.* 5. For example, the rate for 4th class goods loaded in a Container from Trichinopoly Goods to Madura is Re. 0-6-4 per maund as shown below :—

	RS.	A.	P.	
4th class rate inclusive of terminal charge ..	0	6	0	Per maund.
5 per cent extra charge for the use of Containers ..	0	0	4	
Total ..	0	6	4	

10. Merchants who own motor lorries or vehicles capable of transporting these Containers may load or unload them at their premises. A free time of three hours is allowed for each of these operations. The Railway Company is not at present able to provide a lorry service.

11. Merchants desiring to despatch goods in Containers should apply to the Chief Goods Clerks or the Station Masters as the case may be at the stations mentioned.

THE MADRAS & SOUTHERN MAHRATTA RAILWAY CO. LTD. INCORPORATED IN ENGLAND

AT HOLY TIRUPATI

EVERY DAY IS A FESTIVAL DAY

THE beautiful scenery, the sacred waterfalls and the pure mountain air make Tirupati ideal throughout the year : :

ACCORDING to Hindu Mythology, the Tirumalai Hill at Tirupati, known as **Venkatachala,** was originally one of the peaks of Mount Meru, the abode of **Siva** in heaven, but as the result of a fight between **Adisesha,** the thousand-hooded Serpent King and **Vayu,** the God of Wind, it broke from the Holy Mountain and fell to earth : : : : : :

THE Puranas say that **Sri Vishnu** has come down from his abode—the **Vaikunta**—to Tirumalai Hill to reclaim humanity in this Kaliyuga : : :

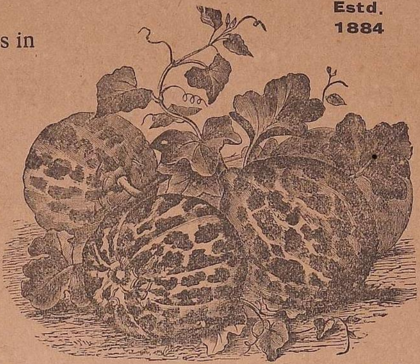
Pay Your Homage to SRI VENKATESWARA the Consumer of Sins, at TIRUPATI

For Safety and Comfort travel by RAIL

Thousands of smiling gardens in India, Burma and Ceylon speak for the purity and pedigree of Pocha's seeds of flowers and vegetables

Handsome illustrated catalogue free on request

Estd. 1884



PESTONJEE P. POCHA & SONS

SEED MERCHANTS

No. 8—Napier Road—POONA

SARDINE FISH MANURES

PLANTERS, GARDENERS & CULTIVATORS

GET THIS FROM **H. C. FERNANDEZ & CO.**

M A N G A L O R E

Tels. & Cables : "**FERNANDO-MANGALORE**"

FISH GUANO—Is the residue after boiling sardine fish and extracting oil, which will contain 7 °/₀ nitrogen and 7 °/₀ phosphoric acid.

MILLED FISH—Fresh Sardine fish sun dried and crushed with machinery which will contain 4 °/₀ nitrogen and 4 °/₀ phosphoric acid.

CAREFULLY NOTE—The above manures are manufactured under the supervision of our specialist of 25 years' experience and supplied to various places, such as: Colombo, Calcutta, Japan and all over India, in large quantities at any time, under guarantee, as to analysis. A trial order will convince you.

WE STAND FOR QUALITY **NONE TO EXCEL US**

APPLY FOR RATES, TERMS AND FREE SAMPLES

FISH MEAL

THE BEST POULTRY FOOD AND TONIC

The inclusion of Fish meal in the daily diet of Poultry has revolutionized Poultry keeping in the West. Protein, Lime, Vitamin A and D are indispensable for intensive production of eggs and rapid growth in Poultry. Fish meal has come to be recognized in recent times as an important addition to Poultry food on account of the presence in it of these essential ingredients in a highly concentrated form. Prepared under Hygienic methods, cooked, powdered, sterilized and packed in air-tight tins, it remains good for months and can be readily administered to the costliest and most carefully tended birds. It is manufactured only at the Government Experimental Station, Tanur and is used extensively all over India and Burma. Cheap substitutes which have appeared in the market should be avoided as they are of little value and may prove positively harmful ∴ ∴

On account of abundant Sardine season the meal is now offered at Re. 0-1-6 a lb. instead of the meal at Re. 0-4-0 a lb.

Samples and pamphlets containing
∴ *analysis and direction free* ∴

APPLY TO—

The RESEARCH ASSISTANT
GOVERNMENT FISHERIES
EXPERIMENTAL STATION, TANUR (South Malabar)

THE COOPER ENGINEERING WORKS
SATARA

Manufacturers of the finest Agricultural Implements and Machines, efficient and cheap Water-lifts (Patented) and Crude Oil Engines, etc., etc.

Iron Ploughs brought to absolute perfection.

Approved and highly recommended by the Agricultural Department after prolonged trials and are in use all over in India.

Sold by thousands every year.

Cooper No. 11 Plough.—A light steel plough with a cast chilled share. Highly rocommended for loamy, clayey and sticky moist soils. Excellent in turning and scouring in even most moist and sticky conditions. Cuts a furrow 5 inches deep and 7 inches wide and can be drawn by the small-sized animals. Weight about 28 lb.

Cooper No. 25 Plough.—A very light plough with a steel mouldboard and a chilled share and is used for any kind of wet and light soils. Makes a furrow 4½ inches deep and 6 inches wide; being very light in draught, it can be drawn by smallest sized animals. Weight about 18 lb.

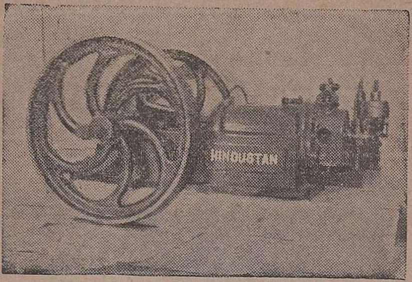
Cooper No. 26 Plough.—An all-cast chilled plough with a sloping landside suitable for all general purposes and especially sandy soils. Ploughs 6 inches deep and 8 inches wide, moderate in draught with medium-sized animals. Share points are renewable. Weight about 33 lb.

Cooper Patent Persian Wheel Water-lift.—The original Persian wheel now perfected under a patent. It is the unique water-lift of its kind available in India. It is the "cheapest," "highly efficient" and "robust in construction," "very simple" to manipulate, "adjustable to minimum draught," with the least strain on the cattle driving it. Minimum charge of water per hour 2,000 gallons. Maximum discharge of water per hour 7,000 gallons. Sufficient supply of water to irrigate about 2 acres of land per working day. Lift links adjustable to required length according to the varying depths of wells. Standard outfit can be had with buckets in sizes from 1, 1¾, 2, 2½ and 3 gallon capacity.

Further particulars and prices of all the above may be ascertained from the nearest Government Agricultural Depot or from the Manufacturers.

HINDUSTAN
COLD STARTING CRUDE OIL ENGINES

SIMPLE AND ROBUST CONSTRUCTION



STARTS INSTANTLY FROM COLD

Very Economical in Operation

MANUFACTURED BY

THE COOPER ENGINEERING WORKS, SATARA

SOLE SELLING AGENTS ☞ **Duncan Stratton & Co.**

5, BANK STREET, BOMBAY

Are you interested in Agriculture

Do you wish to increase the produce of your land

Do you want to reduce your cost of production

Are your crops attacked by pests and diseases

Do you require free scientific advice from a body of experienced officers

?

Then read the **MADRAS AGRICULTURAL JOURNAL**

¶ A monthly Journal in English devoted to the furtherance of Scientific Agriculture. It contains articles of scientific as well as general interest written in popular language.

Published at the **Agricultural College, Coimbatore** LAWLEY ROAD P.O. (S. INDIA)

Rs. 4 per annum. *Single copy Annas 6.*

Apply for Free Specimen Copies mentioning the Villagers' Calendar to

THE MANAGER, THE MADRAS AGRICULTURAL JOURNAL AGRICULTURAL COLLEGE, LAWLEY ROAD P.O. (S. INDIA)

THE MADURA DISTRICT BOARD.

Prospectus of the Agricultural Middle School, Usilampatti (Madura District).

---

1. The school is under the management of the District Board, Madura.

2. The school is situated in Usilampatti village which is a Railway station on the Madura-Bodinayakkanur line. A farm is attached to the school. It is 15 acres in extent and consists of both dry and garden lands and all the important crops in the district are cultivated.

3. It imparts instruction in elements of agriculture, in fruit, flower and vegetable farming and also animal husbandry. Students are taught to handle the various improved implements such as iron ploughs, seed drills, cultivators, etc., and they are expected to do all the practical field work of the farm themselves for not less than 3 hours a day on all the working days.

4. Admission is open to all candidates irrespective of caste or community. They should have a good knowledge of Tamil and elementary knowledge of arithmetic and the pupils who have studied up to the Lower Secondary standard will be preferred. The Headmaster will, however, use his discretion in the selection of candidates with less qualifications if he finds them capable to understand the teaching. Preference will be given to students who own lands and who are physically fit to handle the ploughs and implements. Candidates should not be less than 15 years of age. Tuition is given free. Landed proprietors may depute their sons, relations or servants to undergo the training. The period of training is two years. In the case of students who have passed the VIII standard (Certificates being issued by the Deputy Inspector of Schools) or III form in secondary school, or higher, their period of training will be for one year only.

5. Candidates from the Piramalai Kallar community will be provided with free boarding and lodging by the Labour Department. The Madura District Board will also provide free boarding and lodging to deserving students of other communities. Every encouragement will be given to those students who wish to cultivate their own lands.

6. The Director of Public Instruction, Madras, in his proceedings No. 2559-E/33, Madras, dated 6th December 1933, has declared that the passed students of this school are eligible for admission in the Higher Elementary Teachers' Training course in the Government training schools for masters in all the Tamil districts and the same has been communicated to all the District Educational Officers of the Tamil districts.

7. All selected candidates will have to deposit Rs. 3 as caution money. Besides, those who are provided with free boarding by the District Board will have to deposit Rs. 7 in addition and also, execute an agreement in the prescribed form. They will have to pay Re. 1 per annum to the games fund.

8. Applications for admission should reach the Headmaster, Board Agricultural Middle School, in the prescribed form on or before 15th June every year.

The school re-opens in the 1st week of July every year.

For further particulars please apply to the Headmaster.

AGRICULTURAL MIDDLE SCHOOL,
USILAMPATTI.

PRESIDENT,
Madura District Board.

Notes on the working of:

(1) Panthalayini Weavers' Co-operative Society
(2) Puthentheru Weavers' Co-operative Society } in Malabar.
(3) Kattilangadi Weavers' Co-operative Society

The Panthalayini Weavers' Society was started in 1926 with the object of improving the handloom industry and thereby improving the economic condition of the weaver community in the village of Panthalayini which is situated near the Railway Station (S.I.R.) of the same name.

Owing to its limited resources the society could provide work only for five weavers. The society purchases yarn and distributes the same among the weaver members for the production of cloth. They are paid wages in cash. Shirtings, mundus, bath towels and bed sheets are manufactured by the society at present to meet local demand. It can produce varieties of cloth according to pattern also. Only swadeshi yarn is used.

The Puthentheru and Kattilangadi Weavers' societies situated near Tanur Railway Station (S.I.R.) also manufacture swadeshi cloth of the varieties described above. These two societies provide work for 12 members. Most of these members have been given advances to equip themselves with improved handloom appliances. The society purchases rice from wholesale dealers for distribution among the members in lieu of wages. These three societies have sold cloth to the value of about Rs. 1,500 in the year 1932-33.

The products of these societies are available at the depot at Calicut which is run under the direct supervision of the Devadhar Malabar Reconstruction Trust, Malabar. The address of this depot is the Co-operative Sales Depot, Court Road, Calicut P.O. The Government have been pleased to grant a subsidy of Rs. 400 for the upkeep of this depot in 1933-34.

These societies can develop on sound lines if they are sufficiently encouraged. It is hoped that the public in general and co-operative institutions in particular will extend their hearty co-operation by patronizing these societies.

Established **SOUTH INDIA** *1932*

Co-operative Insurance Society, Ltd.

POST BOX No. 182, G.T., MADRAS.

The Society was registered on 6th January 1932 and commenced business in the month of April 1932. Every policy-holder should be a shareholder and no share can be allotted to individuals who are not policy-holders except to co-operative societies. The value of each share is RUPEE ONE only. No individual can take more than One Thousand Shares but a co-operative society can take any number of shares. The maximum dividend payable on share capital is limited to 9 per cent under the Co-operative Societies Act. Policies are issued from Rs. 100 to Rs. 5,000. This is the first Society of its kind in South India. Being a co-operative organization it has the support of the Co-operative Movement, Government of Madras and the various Co-operative Central Banks in the Presidency. Branches of this Society are opened at the headquarters of Central and important Urban Co-operative Banks and the Boards of the Society attached to those banks work through the Inspectors and Supervisors of the Co-operative Institutions and other suitable agents. Every villager can join the Society and avail himself of the benefits of insurance at a moderate cost.

For detailed particulars apply to the Secretary, South India Co-operative Insurance Society, Ltd., Post Box No. 182, G.T., Madras.

The Madura District Co-operative Paddy Sale Society, Ltd.

No. A-1235—MADURA.

The Society was started in April 1934 by the Hon'ble Mr. P. T. Rajan, Minister, Government of Madras, to alleviate economic distress of agriculturists. It deals mainly in paddy. The Society advances 75 per cent of the value of produce, arranges for sale at favourable market and distributes profit as bonus to members.

A trial will convince the utility of such society,

Note.—A similar society with same object is working profitably in Dindigul Town chiefly for groundnut and cotton.

SECRETARY,
Co-operative Paddy Sale Society.

HILL PRODUCE

CHEAPEST BUT FRESH STOCK

Available always with the **VIZIANAGRAM CO-OPERATIVE STORES, LTD., Vizianagram**

Ananthagiri Coffee Seeds : Bengal gram : : : :
Horse gram : : : : Turmeric : : : : :
Green gram : : : : Tamarind and Mustard :

ARE OFFERED FOR SALE, WHOLESALE AND RETAIL

Prices moderate.

FLUCTUATIONS ACCORDING TO SEASON

LOOK SHARP—*Apply to*—

The Secretary,
The Vizianagram Co-operative Stores, Ltd.,
Vizianagram (Vizagapatam District).

The Koilpatti Co-operative Sales Society, Ltd., No. 0. 522, Koilpatti.

Registered under Act II of 1912 (India).

This is a society whose main object is to facilitate the marketing of Cotton produced by its members. Loans are given to members on the Security of Cotton. Superior Cotton Lint, Cambodia and Karunganni Seeds are always available for sale at advantageous prices.

Further particulars can be obtained from

The Secretary of the Society.

The Salem Weavers' Co-operative Society, Ltd.

Registered under Act II of 1912 (India).

This Society was started in August 1930 under the kind patronage of Mrs. Todd to relieve the distress of the unemployed weavers of Salem. This Society manufactures all kinds of sarees and dhoties of very attractive and beautiful designs. Indian Mill-made yarn is used. Colours are guaranteed to be fast. Textures are of very superior quality and the goods are durable. Profit-making not being the object of the Society, its goods are offered direct to the consumer at remarkably **cheap price.**

We undertake to execute any orders according to samples. Goods may be inspected at the Office of the Salem Weavers' Co-operative Society; the Popular Swadeshi Stores, Triplicane; and the following institutions at Madras:—

The Buy Indian League; the Indian Industrials; the National Emporium; the General Swadeshis; the Madras Government Telegraph Employees' Co-operative Society; the Madras Post and Telegraph Employees' Co-operative Society; the Madras Corporation Officials' Co-operative Society; Madras Co-operative Stores in Seven Wells Street and the Swadeshi Emporium, Mount Road.

A trial order will convince you of the superiority of our goods.

S. THAMMANNA CHETTIAR, B.A., B.L.,

President, Salem Weavers' Co-operative Society, Ltd., FORT, SALEM.

JAGGERY OF ALL GRADES

Available with the Anakapalle Loan and Sale Co-operative Society, Limited, Anakapalle, during December to May

PRICES MODERATE

FLUCTUATIONS ACCORDING TO SEASON

For further particulars apply to—

THE SECRETARY,

CO-OPERATIVE LOAN AND SALE SOCIETY,

Anakapalle.

USE ALWAYS KERALA SOAPS

FAMOUS FOR THEIR PURITY AND CHEAPNESS

WILLINGDON.—The Queen of Toilet Soaps as supplied to Their Excellencies the Earl and Countess of Willingdon.

SANDALWOOD.—Cooling and invigorating. The best soap for the summer use. Delightfully scented to suit all tastes.

VEP SOAP.—A new product of the Kerala Soap Institute containing the essence of margosa or neem oil. Highly recommended for toilet and nursery.

ROSE SOAP.—Possessing the fragrance of fresh cut rose.

VEGETOL.—Lathers even in hard water. Entirely free from animal fat.

WASHWELL.—Dispels dirt like magic.

COAL TAR (CARBOLIC).—Excellent disinfectant soap for the nursery and bath.

Other Household and Toilet Soaps also available.

FISH OIL INSECTICIDAL SOAP.—Highly recommended for killing coffee bug, tea blight, mango hopper and insects attacking vegetable and fruit gardens.

All Soaps Guaranteed Pure.

(Useful bulletins on oils and soaps available. Enquiries solicited.)

For Price List and other particulars apply to the

SUPERINTENDENT, KERALA SOAP INSTITUTE, CALICUT

(By Appointment to His Excellency the Earl of Willingdon, Viceroy and Governor-General of India and to His Excellency the Governor of Madras.)

Or to the following Agents and Stockists :—

AGENTS

MALABAR, COIMBATORE, THE NILGIRIS AND MYSORE STATE INCLUDING BANGALORE.—R. C. Dalal, Calicut.

MADRAS, CHINGLEPUT, NORTH ARCOT, SOUTH ARCOT, CHITTOOR AND NELLORE.—Khan Bahadur Adam Hajee Mohomed Sait Bahadur, No. 7, Bunder Street, Georgetown, Madras.

MADURA, RAMNAD, TINNEVELLY AND TRICHINOPOLY.—G. Palaniappa Mudaliyar, Ceylon Fancy Hall, 7, Goods Shed Street, Madura.

COCHIN.—The Kerala Swadeshi Stores, Ltd., Trichur.

CEYLON.—Devar & Co , 116, Wolfendahl Street, Colombo.

BENGAL, BIHAR AND ORISSA AND ASSAM.—Jorasako Stores, 370, Upper Chitpore Road, Calcutta.

BOMBAY PRESIDENCY.—P. Muncherji & Co., 10, Hamam Street, Fort, Bombay.

BURMA.—Sri Ganesh Stores, 140, 48th Street, Rangoon.

SIND, THE PUNJAB, NORTH-WEST FRONTIER PROVINCE, BALUCHISTAN, RAJPUTANA AND THE STATES OF JAMMU AND KASHMIR.—Fakir Walji & Sons, Bunder Road, Post Box No. 245, Karachi.

WEST GODAVARI, KISTNA AND GUNTUR.—S. Ch. Mallapparaju, Manufacturers' Representative, Bezwada.

TANJORE.—K. Raghavendra Row, 180, Big Bazaar Street, Kumbakonam.

GANJAM, VIZAGAPATAM, AND EAST GODAVARI.—Raju & Co., Vizagapatam.

STOCKISTS

NIZAM'S DOMINIONS.—K. Viswanatham Chetti, General Bazaar, Secunderabad.

KURNOOL.—Krishna & Sons, General Merchants, Kurnool.

BELLARY.—H. Rangana Goud & Bros., General Merchants, Bellary.

CUDDAPAH.—Ghousekhan Lohani, General Merchants, Cuddapah.

ANANTAPUR.—B. C. Audinarayana Chetti & Sons, Anantapur.

SALEM.—Natesan & Co., Big Bazaar Road, Coimbatore.

To ensure prompt attention refer to the Villagers' Calendar.

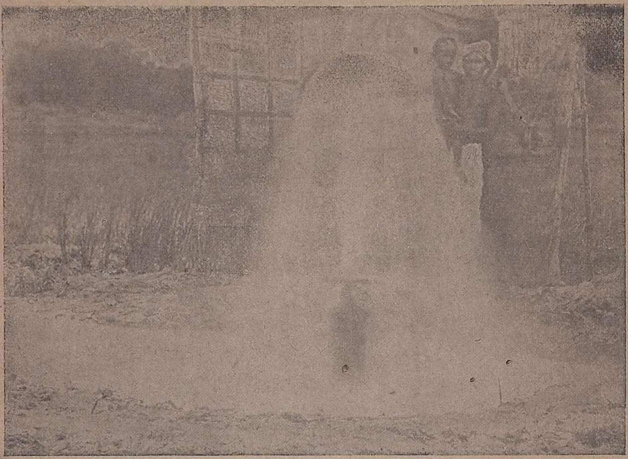
KERALA SOAP INSTITUTE CALICUT

undertakes the analysis
of oil seeds, oils, soaps
and such products

FEES MODERATE
Enquiries Solicited

ARTESIAN BORING

Put down by THE ENGINEERING SECTION of
THE DEPARTMENT OF INDUSTRIES, MADRAS



Name of Party—Mr. Manikyam Pillai.

Place—Kavanur Village, Vriddhachalam Taluk.

Size of Borehole—6 inches.

Depth of Borehole—253 ft. below ground level.

Discharge—420 gallons per minute continuously day and night.

Note.—Three artesian springs were tapped in the same village for three different parties which discharge continuously 300 to 420 gallons per minute.

For departmental rules, please see article on Department of Industries.

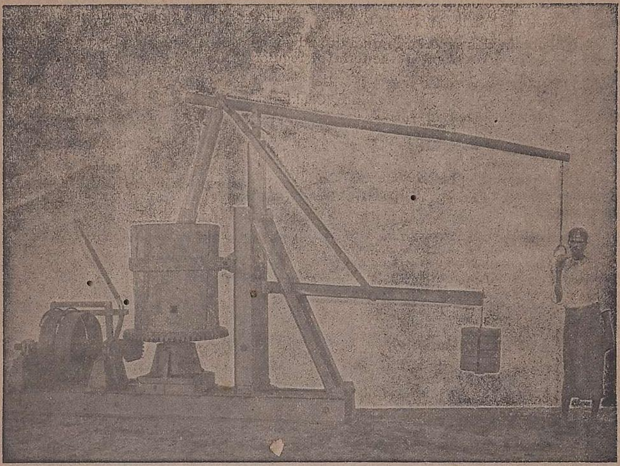
To ensure prompt attention refer to the Villagers' Calendar.

DEPARTMENT OF INDUSTRIES

ENGINEERING SECTION

PINTO CHEKKU

1. Eminently suitable for crushing oil seeds, e.g., gingelly, groundnut, copra, castor. Very economical in working. Owners of steam, oil or gas engines or electric motors can work it without extra cost for power. Their existing engines or motors will run it.



2. This is the result of long and careful experiments carried out at the Industrial Engineering Workshop.

3. *Distinctive features*—

(*a*) The oil-seed does not come into contact with any metal surface.

(*b*) Improved ball thrust bearing makes the motion of the mortar easy and efficient.

(*c*) Special swivel cap protects the pestle and mortar from damage that might be caused to them by hard substances getting between.

(*d*) Bevel gears are of extra strong profiles.

(*e*) Side thrust on the machine is efficiently overcome by the provision of a pair of rollers bearing against the revolving mortar.

(*f*) Regulation of crushing pressure is secured by simply varying the number of iron weights, supplied with the machine, as and when required.

(*g*) The whole arrangement is neatly mounted on two stout girders provided with holes to receive foundation bolts.

To ensure prompt attention refer to the Villagers' Calendar.

Performance

Capacity per charge normal (gingelly).	10 Madras measures (26 lb.).
Time taken to crush a charge ..	45 to 50 minutes depending upon the dexterity of the oilman, and quality of seed.
Oil obtained	3½ viss (11 lb.).
Speed	9 revolutions per minute.
Horse-power required	2½.
Percentage of oil extraction ..	42 per cent to 44 per cent according to the quality of gingelly crushed.

4. Oil obtained is superior in quality and eminently suitable for all edible purposes. Punack or cake is obtained in the form of regular flakes and is very popular as cattle food.

5. The performance of the Pinto Chekku, the Bullock-driven Chekku and the Rotary Iron Mill compared—

Pinto Chekku

Requires only one-fourth of the space taken by the bullock-driven ghany.

Smooth and silent working.

Greater capacity—greater output—greater efficiency and lesser crushing cost. Total crushing charges per ton of gingelly Rs. 23.

Pinto Chekku

Pure, clean, wholesome oil, eminently suitable for all edible purposes.

Good flaky punack readily saleable. Easily repaired and spare parts easily made by village carpenter and blacksmith.

Bullock-driven Chekku

Requires considerable floor space to instal—noisy.

Rapid deterioration of driving bulls—limited capacity—total crushing charges per ton of gingelly Rs. 48.

Rotary Iron Mill

Oil reddish in colour owing to contact with steel crushing surfaces, considered unsuitable for edible purposes.

Punack powdery, not in general demand for cattle food. Repairs and renewals cannot be done in the village.

6. Quite a number of Pinto chekkus have already been installed in Madras and the mufassal. Intending purchasers will be afforded facilities for inspecting them under working conditions if desired.

7. This department will gladly undertake the erection of the Pinto chekku in any part of the Presidency.

For further particulars please write to—

The Industrial Engineering Workshop

Kathivakkam High Road, Old Washermanpet, MADRAS

To ensure prompt attention refer to the Villagers' Calendar.

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THE VILLAGERS' CALENDAR, 1935.

I.—AGRICULTURE.

1. The Madras Agricultural Department—Its Purpose.

The need for introducing an improved system of agriculture, the chief occupation of the people of the Presidency, was recognized as long ago as 1854 although the Mutiny prevented active steps being taken until 1863. The first beginning was the opening of a "model" farm at Saidapet in 1864. From that date the Department has been gradually expanding. There are four ways in which the Department is trying to help the cultivator, namely :—

(a) Research.

The research work is of two kinds. There is first of all the research into the fundamental problems underlying the practice of agriculture which is carried on by a staff of specialists at the Agricultural College, Coimbatore. Linked up with that is the research carried on by Deputy Directors in charge of circles who have their own stations at which the discoveries of the Research Institute are tested for their suitability to local conditions and who carry out investigations in connexion with local problems affecting their circles.

(b) Propaganda.

For administrative purposes the Presidency is divided into eight circles, each in charge of a Deputy Director. To help him in administrative and inspection work Assistant Directors are attached to most of the circles. There is a number of demonstrators employed in each circle. The jurisdiction of each demonstrator is confined to one taluk. There are in the Presidency 221 taluks and the number of demonstrators that are now actually employed is 150. There are still some taluks without a demonstrator. Steps are being taken to see that each and every taluk is provided with a demonstrator. For details of propaganda work done the attention of the reader is invited to notes on "Work in different circles," where it is fully explained. **The Department does not advocate any methods which require more capital expenditure than the ordinary ryot is able to afford.** Further the improved methods that are advocated or the improved strains that are distributed are the results of patient work that has been carried out on the research stations and proved successful.

(c) Education.

There is an Agricultural College at Coimbatore where students go through a course both in practical and theoretical agriculture which lasts for three years. They learn there all processes on wet, dry and garden lands so as to become thoroughly familiar with them and to be able to direct their own labour late in life. A short course in Practical Agriculture lasting

from July to March is also given at Coimbatore to meet the needs of young men owning land who cannot undergo the three years' course in Agriculture. There is an Agricultural School at Usilampatti (Madura) managed by the District Board.

(d) Loans.

The Deputy Directors of Agriculture in charge of circles are empowered to sanction loans for the purchase of agricultural implements up to Rs. 25 in each case and the Director of Agriculture for loans above that limit. The total sum so granted to ryots came to Rs. 12,220–2–0 during 1933–34. The kind of implements and the number purchased by them with the aid of these loans are noted below:—

Kind of Implements.

	No.		No.
1. Ploughs	1,279	4. Roll easy mhote wheels.	70
2. Persian wheels ...	7	5. Horticultural implements.	11
3. Sugarcane power crushers	3	6. Other implements and spares	397

2 (a). First Circle.

The first circle comprises the districts of Gōdāvari West, Gōdāvari East, Vizagapatam and Ganjām. Those who require assistance or advice on agricultural matters and who reside in Gōdāvari East and West districts should apply to the Assistant Director of Agriculture, Rajahmundry, and those who live in Vizagapatam or Ganjām district should apply to the Assistant Director of Agriculture, Vizagapatam.

(a) Propaganda.

In order to render assistance to ryots, the demonstrator in charge of each taluk has started intensive propaganda work in three or more central villages. A list of such centres is given below. As work develops, the jurisdiction will be extended and new centres will be opened:—

East Godavari District.

Taluk.	Headquarters.	Centres of work.
1. Rajahmundry ...	Rajahmundry ...	Rajahmundry. Jegurpadu. Dosakayalapalli.
2. Cocanada	Cocanada	Cocanada. Velangi. Medapadu. Hussainpuram.
3. Ramachandrapuram.	Ramachandrapuram.	Ramachandrapuram. Dwarapudi. Mandapeta. Kotipalli.

East Godavari District—*cont.*

Taluk.	Headquarters.	Centres of work.
4. Razole ...	... Kothapeta ...	... Kothapeta. Devarapalli. Pasarlapudi. Razole.
5. Tuni ...	... Tuni ...	... Hamsavaram. Kothapalli. Kotanandur. Tuni.

West Godavari District.

Taluk.	Headquarters.	Centres of work.
1. Narasapur ...	... Narasapur ...	... Sitarampuram. Achanta. Doddipatla. Narasapur. Palacole.
2. Ellore ...	... Ellore ...	... Peddavegi. Pulla. Vijarayi.
3. Tanuku ...	... Tanuku ...	... Siddhantam. Penumantra. Attili.
4. Tadepalligudem	... Tadepalligudem	... Pippara. Ungaturu. Ananthapalli. Tadepalligudem.
5. Bhimavaram	... Bhimavaram	... Akidu. Viravasaram. Vendra. Bhimavaram.

Ganjam District.

Taluk.	Headquarters.	Centres of work.
1. Aska ...	... Aska... ...	... Kalasandapur. Kondravalli. Dharakota. Kamalodevipur.
2. Berhampur	... Berhampur ...	... Holdyapodoro. Dengapodoro. Saru. Pattupuram. Pincholi. Chammakhandi.
3. Sompeta ...	... Sompeta ...	... Palasapuram. Bellupada. Pucchapadu.
4. Chicacole ...	... Narasannapeta	... Narasannapeta. Singupur. Jalumuru.

Vizagapatam District.

Taluk.	Headquarters.	Centres of work.
1. Palakonda ...	... Palakonda ...	... Palakonda. Nadukurru. Bhurja.

Vizagapatam District—*cont.*

Taluk.	Headquarters.	Centres of work.
2. Bobbili ...	... Bobbili ...	... Kunaya Valasa. Mallammapeta. Piridi. Ramabhadrapuram. Kasapet. Lakshminarayana-puram.
3. Vizianagram	... Vizianagram	... Dharmapuri. Denkada. Moida. Jami.
4. Vizagapatam	... Vizagapatam	... Pendurti. Madhuravada. Kaniti.
5. Viravalli ...	... Chodavaram	... Chodavaram. Jagannadhapuram. Medivada. Kodur.
6. Anakapalle ...	... Anakapalle ...	... Thummapala. Mulagapaka. Gobburu. Paravada.
7. Sarvasiddhi ...	... Yellamanchili	... Somalingapalem. Padmanabharajupet. Godicherla.
8. Golgonda ...	... Narasapatam	... Narasapatam. Kondala Agraharam. Kota Uratla. Konthakota. Sarabhavaram.

Taluks not represented by Demonstrators.

Ganjām district.—Gumsur, Surada, Kudala, Chatrapur, Tekkali and Parlakimedi.

Vizagapatam district.—Salur, Srungavarapukota, Parvatipur and Chipurupalle.

Gōdāvari East district.—Pithapuram division, Peddapuram and Amalapuram.

Gōdāvari West district.—Chintalapudi and Kovvur.

The important crops on which improvements are effected are paddy, sugarcane and ragi. In addition to improvements in cultivation, demonstrations are given on methods by which manure may be conserved most advantageously, the growing of green-manure or fodder crops, control of pests and diseases on different crops such as the paddy grasshopper, tobacco aphis, brinjal epilachna, citrus foot-rot, coconut stem bleeding disease, etc., control and management of cattle and maintenance of a supply of good and pure seed. Demonstrations are also given regarding improved

methods of water lifts and the use of iron ploughs and the harrow called Guntaka. Advice will also be given regarding the best type of sugarcane mill to be used including pans and other equipment. In order to show to ryots how their local methods of cultivation may be improved, demonstration plots are maintained in each centre. This is a plan by which one or more fields of equal fertility and on the same level are used in the cultivation of a particular crop on the old method which is compared side by side with one grown by methods advocated by the Department. When possible, two crops are harvested separately and the costs of production are compared. In addition, proper breeding, housing and rearing of cattle, sheep and goats, side lines such as poultry keeping, bee-keeping and ericulture are also demonstrated.

In the case of paddy crop, the main general improvements advocated are—(1) cultivation of superior varieties such as Mypali 7 and 30 (under-trial), Navakotisannam 3 and 4, Bangarutheega, Ratnachudi 7 and 9, *Gunupurusannam* 46, GEB. 24, Punasa Akkullu 3, Sunkisannam No. 5 and Bobbiliganti No. 1 in Ganjām and Vizagapatam districts and Akkullu and Punasa Konamani varieties and strains in the Gōdāvari districts, (2) reduction of seed-rate and planting robust seedlings, (3) green-manuring and use of bonemeal and superphosphate.

In the case of sugarcane, the improvements advocated and demonstrated are—(1) cultivation of superior varieties such as J. 247, Co. 213, M.A. 21 and Co. 281, (2) thorough preparation of land with improved implements, such as Cooper plough No. 11 and the H.M. Guntaka Nos. 1 and 2, (3) wide planting in lines and reduction of seed-rate, (4) raising of superior seed material and rapid multiplication of the new varieties by the short crop method, (5) substitution of the bullock power for hand labour in after-cultivation, (6) introduction of improved mills for crushing canes and manufacture of jaggery on improved lines.

Under other crops, sowing of groundnut in every furrow instead of in alternate furrows to obtain increased yields and cultivation of plantains in improved lines are also advocated.

In addition to the above, small exhibitions are held on festival and other occasions such as the Collector's jamabandi, cattle fairs, etc. Such exhibitions include display of specimen implements and the demonstration of their use, display of different varieties of seeds and manure, charts relating to recent research work that can be applied in the districts, charts showing the life-history of common local pests. In addition to such small exhibitions, a larger display is given once per annum in each district in selected centres where the work of the Department is shown on a wider scale. Once a year the motor exhibition vans visit a number of villages on the road side. On all these occasions lectures are also delivered with or without lantern.

We now have a sufficient number of lantern slides to give lectures on the improvement of the main crops with which we deal. Such lectures are given in the centres of work and on other occasions by the district officers.

The list of articles available in the depots in the circle is given below. The name of the officer, to whom application should be made by those who desire to make purchase, is also indicated. The demonstrators also undertake to arrange for the supply of articles not stocked in the depots, from other places where they are available.

In addition to advice and help given by the Agricultural Department, assistance is rendered by the **Co-operative Department which aims to develop the co-operative spirit in making purchases and in the disposal of produce.** The work of this Department through credit co-operative societies enables ryots to obtain credit for agricultural operations. Advice and information on such matters may be obtained by application to the Deputy Registrar of Co-operative Societies, Rajahmundry, in the case of those residing in Gōdāvari West and East districts, in the case of those in Vizagapatam, the Deputy Registrar, Vizagapatam, should be addressed and in the case of those in Ganjām, the Deputy Registrar of Co-operative Societies, Ganjām, Berhampur should be addressed.

The pumping and boring section of the Industrial Department assists cultivators by the loan of boring plants and the supervision of operations connected with the sinking of boreholes. Information concerning the scale of charges and conditions under which such plants are loaned may be obtained by application to the Assistant Industrial Engineer, Bezwada. The staff of the Agricultural Department will always give advice regarding the agricultural aspect arising on account of an improvement in water-supply. It will also render assistance as far as possible in examining conditions from the agricultural aspect in connexion with the application for a loan to purchase a pumping plant to which reference is made elsewhere in this calendar.

List of Depots with the Names of Officers of the Agricultural Department to whom Application for Seed, Manure, etc., should be made.

District.	Names of places where depots are stationed.	Designation of the officer to whom application should be made.
West Gōdāvari ...	Narasapur ...	Assistant Agricultural Demonstrator, Narasapur.
	Tanuku	Assistant Agricultural Demonstrator, Tanuku.
	Ellore	Agricultural Demonstrator, Ellore.
	Tadepalligudem ...	Agricultural Demonstrator, Tadepalligudem.
	Bhimavaram ...	Agricultural Demonstrator, Bhimavaram.
East Gōdāvari ...	Rajahmundry ...	Agricultural Demonstrator, Rajahmundry.
	Samalkota ...	Farm Manager, Agricultural Research Station, Samalkota.
	Cocanada ...	Agricultural Demonstrator, Cocanada.
	Ramachandrapuram.	Agricultural Demonstrator, Ramachandrapuram.
	Kothapeta ...	Agricultural Demonstrator, Kothapeta.
	Tuni	Agricultural Demonstrator, Tuni.
Vizagapatam ...	Anakapalle ...	Assistant Agricultural Demonstrator, Anakapalle.

List of Articles available for Sale at the Central Depot at Anakapalle.

I.—Implements.

Names of articles.	Price. RS.	A.	P.	
Cooper plough No. 11—				
1. Iron parts only	7	0	0	each.
2. Spare shares	0	8	0	"
Cooper plough No. 26—				
3. Iron parts only	8	12	0	"
4. Spare share with point	1	1	0	"
5. Spare points	0	3	6	"
H.M. Guntaka No. 0—				
6. Iron parts only	4	8	0	...
7. Spare blades	1	8	0	each.
H.M. Guntaka No. 1—				
8. Iron parts only	8	0	0	"
9. Spare blades	2	12	0	"
H.M. Guntaka No. 2—				
10. Iron parts only	14	4	0	"
11. Spare blades	3	14	0	"
12. Buck-scrapers	10	4	0	"
13. Mhote buckets, 1—10½" size ...	8	8	0	"
Do. 2—3" " ...	9	10	0	"
Do. 2—6" " ...	14	0	0	"
14. Mhote rope (1½" and ¾" diam.) ...	0	2	0	a pound.

II.—Seeds and Plants.

Names of articles.	Price. RS.	A.	P.	
1. Paddy seed coarse varieties. About	4	8	0	per bag of 164 lb.
2. Paddy fine varieties ... "	5	8	0	"
3. Sunnhemp seed ... ... "	0	1	0	per lb.
4. Dhaincha seed ... ... "	0	1	6	"
5. Pillipesara seed ... ... "	0	1	6	"
6. Indigo ... ... "	0	1	0	"
7. Wild indigo ... ... "	0	1	0	"
8. Sugarcane seed material (J. 247, Co. 213, M.A. 21 and Co. 281).	2	8	0	per candy of 500 lb.
9. Cambodia cotton seed ... About	0	1	0	per lb.
10. Himayuddien mango grafts ...	1	0	0	each.
11. Citrus seedlings (country or Vadlapudi orange, pomelo, lime, etc.) about one year old.	0	2	0	"

Note.—Prices are subject to fluctuation. Ryots requiring any seeds, implements, etc., should apply to the Demonstrator of the taluk, who will arrange for their supply.

List of Articles available at the Depots in Gōdāvari District.

Names of articles.	Price. RS.	A.	P.	
Paddy seed, fine	4	12	0	per bag of 166 lb.
	to 4	15	0	
Do. coarse	3	12	0	"
Dhaincha seed	0	1	3	per lb.
Pillipesara seed	0	1	0	"
Cambodia cotton seed	0	1	0	"
Seemachinta seed (*Pithecolobium dulce*).	0	0	9	"
Sugarcane setts	2	8	0	per 500 lb.
Cooper plough No. 11—				
Iron parts only	8	2	0	each.
New model	7	0	0	"
Spare shares for the above	0	9	0	"
New model	0	8	0	"
Cooper plough No. 26—				
Iron parts only	8	12	0	"
Spare share with point	1	1	0	"
Spare point alone	0	3	6	"
Arrangements will be made for supply of the following :—				
Plantain suckers	6	4	0	per 100.
Elephant grass slips	0	2	0	"
Guinea grass slips	0	2	0	"
Roll easy mhote wheel	12	12	0	each.
Buck-scraper	9	4	0	"
H.M. Guntaka No. 0, 6″ straight blade—				
Iron parts only	4	8	0	"
Spare blades, 6″	1	8	0	"
H.M. Guntaka No. 1, 15″ curved blade—				
Iron parts only	8	0	0	"
Spare blades, 15″	2	12	0	"
H.M. Guntaka No. 2, 24″ curved blade—				
Iron parts only	14	4	0	"
Spare blades, 24″	3	14	0	"
Cooper plough No. 25—				
Iron parts only	4	8	0	"
Spare shares for the above ...	0	5	6	"

N.B.—Prices vary according to market rates.

(b) Research.

The Agricultural Research Station, Maruteru.

This station was opened in July 1925. It is situated in the village of Neggipudi, Tanuku taluk of the West Gōdāvari district within a quarter of a mile from the Maruteru lock of the Narasapur canal. It is reached in a journey of 21 miles by boat along the Narasapur canal or by bus from Nidadavole railway station on the Madras-Calcutta line (M. & S.M. Ry.). The station is 50 acres in extent.

WHAT TO SEE AND WHEN TO SEE.

May-June.—Sowing of paddy nursery under wet and dry system for the main crop and economic planting, standing green-manure crops for the main crop and green forage crops for fodder, different pyru crops standing and use of levelling board for wet land.

July.—Sowing of main crop nursery and economic planting of paddy, use of levelling board for wet lands.

August.—Short-duration varieties, Kuruvai and Swarnalu in flower, systematic roguing of seed plots for the maintenance of the purity of the paddy crop. Utilization of field bunds for growing pulse crops.

September.—Garikasannavari in flower, roguing in seed plots, utilization of field bunds for growing pulse crops.

October.—Basangi, Rasangi and Akkullu in flower, roguing in seed plots, pulse crop on field bunds.

November.—Kristnakatukulu, Konamani, GEB. 24, Atragada (Kusuma, Vankisannam— Kistna Delta varieties) all in flower, roguing in the above and in seed plots, pulse crops on field bunds.

December.—Pulses and condiments for seed as an intersown crop in main crop paddy and early nurseries started semi-wet but reared thereafter dry.

January.—Sowing and economic planting of paddy for Dalwa or second crop—green-manure crop for second crop paddy, sunnhemp for hay, intersown in the main crop, pulses on field bunds for green fodder, and early planting of Dalwa with seedlings raised dry.

February.—Green-manure crop for second crop paddy, sunnhemp intersown in the main crop for fodder. Economic planting of the second crop paddy and sugarcane harvest, milling and jaggery making and working of the Sindhewahi furnace.

March.—Different pyru crops—onions, castor, gingelly, ragi, vegetables, etc., as alternatives to second crop paddy, pulses and condiments, crop for seed in the main crop paddy and sugarcane crop in harvest.

April.—Dalwa or second crop in flower, green forage crops for summer, pyru crops standing.

Note.—Improved methods of cultivating plantain and sugarcane, Archimedean screw for short lifts in places of Karem and swing baskets, chaff-cutter for chaffing sunnhemp hay and cholam straw, care and systematic feeding of animals and the conservation of cattle-manure in shallow loose-box stalls, can be seen at all times of the year.

PROBLEMS UNDER INVESTIGATION.

1. Improvement of yields by selection.

2. Modification of the usual method of selection trial of a mixture of strains rather than a single strain.

3. Improvement of yield by hybridization.

4. Second crop problem ; to plant the Dalwa crop as early as possible and tide over the adverse seasonal conditions.

5. Cultural experiments—
(*a*) Double transplanting intended for areas where facilities for early sowings exist but not for early planting.

(*b*) Fine riced varieties when grown in the delta tend to become coarse and lose the premium offered first for their fineness. Evolution of a method to check the grain from becoming coarse.

(*c*) Adjustment of the seed rate according to the size to determine the optimum rate which will result in the economy of seed and hence benefit the crop indirectly.

(*d*) Determination of the most suitable variety for a season for single, double or pyru cropped areas.

6. Manurial trials—

(*a*) Investigations into the economics of the most profitable method of manuring the crop.

(*b*) Subsidized manurial trials.

7. Making cultivation more remunerative by the introduction of other crops in rotation with rice.

(*a*) Cambodia cotton.

(*b*) Sugarcane—

(i) The economics of growing cane in rotation with paddy.

(ii) Sorghum hybrids—testing their suitability for the delta and determination of the best time for planting.

(iii) To reduce the outlay in the cost of cultivating cane by adopting the bamboo railing instead of the usual propping method.

(iv) Studies in the Ratoon crop to see how many more paying stubble crops can be taken in some of the main varieties.

(*c*) Plantains—

(i) The economics of growing plantain in rotation with paddy.

(ii) Increasing the receipts from the plantain crop by allowing two suckers to grow close to each other instead of the usual one.

(iii) Possibility of taking a plantain crop after a short-duration paddy and harvest before the next paddy at least for late planting high level lands so that bunches may be ready for harvest for curry purposes in June-July when other vegetables are scarce.

8. Miscellaneous studies—

(*a*) Two crops trial in the first crop season as pure crops and mixed crops or otherwise known as "Udu system."

(*b*) Study of the collection of varieties in different conditions of growing, early and late plantings; in swamp and semi-wet conditions.

9. Making rice—growing more profitable by reducing the cost of cultivation.

10. Stem borer problem in all its aspects to reduce wastage due to its attack.

Visitors are welcome.

Agricultural Research Station, Samalkota.

The Agricultural Research Station at Samalkota was started in the year 1902. It is situated on the northern extremity of the deltaic area of the East Gōdāvari district on the line of junction of that area with the lighter soils of uplands and on the southern bank of the Samalkota canal and is about half a mile from the railway station on the Cocanada road. The station, as it now exists, is 57·42 acres in extent of which 45 acres are cultivated, the remaining being taken up by buildings, bunds and roads.

What to See and When to See.

January.—Paddy nurseries; preparation of land and planting for second crop paddy; propping with single bamboos and harvest of plantain bunches from standing crop; planting of plantain suckers for sithakattu season; preparation of land for sugarcane, bullock intercultivation in pyru crops like Cambodia cotton.

February.—Same as above; selection treatment and line planting of sugarcane setts; harvest of sugarcane; working of three roller iron mills and jaggery making on improved Gōdāvari and Sindhewahi furnaces.

March.—Sugarcane manufacture by the open pan system; jaggery making; harvest of plantain continues; preparation of plantain figs; intercultivation in pyru and other crops.

April.—Harvest of second crop paddy begins; sowing of green-manure crops like sunnhemp and teegapesara; digging trenches in sugarcane.

May.—Standing crops of sugarcane, plantain and green-manures; harvest of pine-apples, Kew, Simhachalam and other varieties; cotton picking in pyru sown crops; sowing of dry nurseries for the main paddy crop; working of Archimedean screw.

June.—Dry and wet paddy nurseries; ploughing in green-manure and preparation of land for paddy; planting of sugarcane under purely rainfed conditions; sowing garden and dry land crops like Cambodia cotton, maize, soybeans, gingelly, budama paddy and country vegetables. Manuring sugarcane with concentrated manures like cakes, sulphate of ammonia and superphosphate.

July.—Transplantation of single seedlings; application of manures to paddy, bonemeal, sulphate of ammonia, etc., removing superfluous tillers in sugarcane; manuring plantain and pineapples with concentrated manures.

August.—Weeding in paddy; removal of "rogue" plants in paddy to maintain purity of seed; wrapping and propping in sugarcane, in the ordinary as well as railing system.

September to October.—Harvest of early paddy varieties, planting of intermediate crop paddy.

November to December.—Harvest of medium and late varieties of paddy; sowing of green-manure, pulse and pyru crops in paddy stubble; cold weather vegetables like cauliflower, cabbage, tomatoes, etc.

Besides the above, a number of useful items can be seen all the year round. There are different systems of cattle byres in which dry earth and litter are used for conservation of manure pits; compost and artificial manure from farm rubbish. Among side lines are poultry breeding in which are to be seen up-to-date methods of housing, feeding, artificial incubation and rearing; bee-keeping, and extraction of honey; silk worm rearing—both eri and mulberry and spinning and reeling of silk yarn and fish culture. Control of insects and diseases can be seen according to their incidence. Various new fruit plants like grape fruit, fig, tree tomato, etc.; economic plants like kapok, manila hemp, arrowroot, etc., are also grown. A live fence of Simachinta (*Pithecolobium dulce*) is maintained.

PROBLEMS UNDER INVESTIGATION.

Sugarcane.—(*a*) Trial of varieties and Coimbatore seedlings including sorghum hybrids and their selection after a study of cultural and chemical aspects.

(*b*) Trial of varieties under dry, single irrigation and purely rainfed, swamp and normal conditions and ratooning.

(*c*) Other problems under investigation are reduction in cultivation costs, spacing, planting of germinated setts, germination of setts, monthly planting and ripening, different quantities of nitrogen required by different varieties, seed material nutrition with a view to minimize manure bill, etc.

(*d*) Working of various sugarcane crushing mills, furnaces and jaggery making; sugar making by the open pan system.

Paddy.—(*a*) Selection work in trial of varieties in main, intermediate and second crops; comparison of useful strains, maintenance of purity of seed and seed multiplication for distribution.

(*b*) Cultural aspects of dry ploughing; sanding, double transplantation, restricted irrigation, growing of an intermediate crop, broad casting as against transplanting in second crop, manurial needs of paddy after sugarcane, etc.

Plantain.—(*a*) introduction and study of varieties;

(*b*) Seasonal planting and ratooning study of planting material;

(*c*) Chemical requirements and improvement of taste and keeping qualities by suitable manuring;

(*d*) Preparation of "plantain figs" as a cottage industry.

Pyru Crops.—Growing of various crops, viz., Cambodia cotton, ragi, gingelly, tomato, brinjals and other vegetables, castor, tobacco, etc., in wet land in pyru season to find a suitable alternative for second crop paddy.

Green-manure and Fodder Crops.—Growing of various crops like pillipesara, guinea grass, kolakattai grass, sunnhemp, dhaincha, etc.

Fruit Trees and Plants.—Introduction and trial of tropical fruit trees new to the tract and economic plants.

Miscellaneous.—Water requirements of paddy and sugarcane, control of insects and fungoid diseases.

Visitors are welcome.

Agricultural Research Station, Anakapalle.

As originally started in the year 1913, this station was only 41 acres but it was extended in the year 1926 to the extent of 104 acres of which 69·8 acres are under cultivation, the rest being taken up by buildings, roads and bunds. It is situated towards the north of the railway station at a distance of about a furlong on the eastern side of the Chodavaram-Madugula road. It can easily be reached either by road or by rail.

WHAT TO SEE AND WHEN TO SEE.

January to 15th February.—Working of light iron ploughs, adjustments of ploughs to get the required depth of ploughing, marking of plots before ploughing with a view to avoid undulations in the soil and yoking work animals without ropes. The standing crop of sugarcane, planting and harvesting of early cane, planting of summer ragi and threshing of paddy can also be inspected.

15th February to 15th April.—Planting and harvesting of sugarcane on improved lines and with the use of up-to-date appliances, milling of cane with improved iron mills and crushers, preparation of jaggery, cream jaggery and rab on improved single and multiple furnaces, preparation of white sugar by centrifugal machine, working of hand and bullock cultivators in the tender sugarcane crop and planting of cane with the aid of rain water. The standing crop of sugarcane (both short and mature), the behaviour of *Pyru* ragi selections in the field and the feeding of silage to cattle are other items of interest during this period.

15th April to 31st May.—The behaviour of certain sugarcane varieties under drought condition, the sowing of early ragi and cumbu nurseries on improved lines, sugar manufacture direct from cane and palmyra juice by centrifugals and preparation of superior quality jaggery and cream jaggery by the use of activated charcoal, planting of cane under dry conditions and conservation of moisture in the early planted crop by working labour saving implements as hand and bullock worked hoes.

June and July.—Sowing of green-manure and silage crops, sowing of paddy nurseries, application of manure, trenching and wrapping in cane, preparation of silage and planting of ragi and ganti seedlings.

August and September.—Preparation of silage with cumbu and ragi straw with an admixture of sunnhemp, planting of paddy on improved lines, sowing of salu chodi nurseries, planting of cane for short crop seed and the standing crop of sugarcane varieties in the several experimental fields.

October and November.—Roguing in paddy to maintain the purity of seed and harvesting of early cane varieties. This is the best season for any visitor to see the crops of paddy, ragi, sugarcane, etc., which are at their best during this period.

December.—Harvesting and threshing of paddy, sowing of summer ragi nurseries, cutting and crushing of early varieties of cane and working of improved iron ploughs in various fields.

Besides the above, the following items can be seen all the year round—Improved and efficient methods of preserving farm yard manure, cheap and efficient method of feeding work cattle, breeding bulls and milch cows, rearing of eri and mulbury silk worms maintaining of bee colonies, raising of flower and vegetable plants and exhibition rooms. There is a poultry section attached to this station which can be seen.

PROBLEMS UNDER INVESTIGATION.

I. Paddy.—(*a*) Selection of heavy yielding pure lines and comparison of the selected strains with the local standards as control.

(*b*) Study of the effect of green leaf manure on the productivity of these soils and important varieties of paddy.

II. Sugarcane—(*a*) *Varietal Trials.*—(i) Study of the varieties in all aspects as germination, vigour, growth, habit, length and girth of cane, root development, chemistry of the cane, etc.

(ii) Study of the behaviour of varieties under Class I and Class II conditions, the former receiving 56 lb. of nitrogen and restricted water-supply while the latter 100 lb. nitrogen and normal irrigations.

(iii) Study of the behaviour of varieties under the most restricted conditions of manure and water.

(iv) Trial of the promising varieties under swamp conditions in a low-lying land where water stands to a depth of $1\frac{1}{2}$ feet for over four months from August onwards with a view to select varieties that may be useful to localities where drainage is a serious problem. Co. 281 is a variety that grows well under swamp conditions.

(v) Planting of the promising varieties with one irrigation at planting time. These are planted in two series, early and late, the former for localities where irrigation water is available in tanks or canals and the latter for places where lift irrigation is resorted to for planting purposes.

(vi) Trial of varieties under dry conditions in wet, garden and dry lands. As vigorous growth in cane varieties commences from July onwards, as the shifting of planting time from February to April does not diminish the yields and as soaking rains are ordinarily received in the months of February to May, this trial is started with a view to see if a normal crop can be produced under purely dry conditions.

(vii) Trial of promising varieties for sugar production.

(viii) Trial of promising varieties of cane after a punasa crop in wet and garden lands.

(ix) Trial of sorghum X sugarcane crosses—All the hybrids are subjected to a detailed study from various stand points of view, i.e., the behaviour of these under different conditions of soil, manure and cultural treatments.

(*b*) *Manurial Trial.*—(i) Study into the fundamentals of cane nutritions. Nitrogen, phosphoric acid and potash are taken singly and in combinations with and without a basal dressing of organic manure.

(ii) Investigation into the feeding capacities of promising cane varieties for added nitrogen and to ascertain the optimum dose for these promising varieties.

(iii) Comparison of seed cane obtained from intensively and poorly fertilized nurseries. It is observed that seed obtained from intensively fertilized nurseries does not require so much manure as those from poorly fertilized plots to give the same yield. To find out if this can be applied in the case of sugarcane this experiment is started.

(*c*) *Cultural Experiments.*—(i) Seed rate experiment to see if increased seed rates would enhance the yields.

(ii) Deep trench planting as against shallow furrow planting to note their effect on lodging and finally on the chemistry and tonnage of cane.

(iii) *Monthwar Planting.*—Some promising varieties and a few sorghum hybrids are being planted in each month to investigate into the possibilities of having two seasons for sugarcane as in Coimbatore and Madura.

(iv) Planting of seedlings as against setts, to see if the practice now prevalent in Ganjām and some parts of Vizagapatam of raising nurseries and planting the seedlings with the help of hand-waterings can be introduced into this locality.

(v) Seasonal irrigation experiment to note the effect of irrigations on ripening and quality of juice and jaggery.

(vi) Wrapping and propping experiments with a view to evolve cheap and at the same time efficient method of propping in place of the present elaborate and expensive one.

(vii) Ratoon experiments to find out varieties that ratoon well under these climatic and agronomic conditions and to work out economics of ratooning. It was at one time thought inadvisable to ratoon cane

but the introduction of hardy hybrids from Coimbatore offers fresh facilities and more so in these days of depression.

III. Ragi—Pure Line Work.—Selection of heavy yielding types of good quality and comparison of the selections so made with the standards for the characters for which they have been selected.

IV. Miscellaneous Crops.—(*a*) *Millets*—Ganti and korra are the two crops under this head. Varieties are being grown on bulk scale to find out their yielding capacities.

(*b*) *Oil Seeds.*—Gingelly, castor and groundnut are the important crops under this item. A large number of varieties are obtained from the Oil-Seed Specialist, Coimbatore and are being tried for getting heavy yielding types.

(*c*) *Other Crops.*—Tobacco, chillies, soyabeans, Bengalgram and plantains are the important crops under this head and varietal trials form essential portion of the work in these crops.

(*d*) *Fodder and Green-manure Crops.*—Jonna is cultivated in seasons of fodder scarcity while sunnhemp and pillipesara are grown for green manuring.

(*e*) *Fruit and other Trees.*—Various kinds of citrus and other fruit trees are imported and tried here.

(*f*) *Vegetables.*—Both indigenous and exotic varieties are being cultivated and hybridization is being carried out with a view to produce new and useful forms.

(*g*) *Flowering Plants.*—A variety of flowering plants—roses, jasmine, crysanthimum, asters, phlox bouganvillia, etc., are being raised and are available for sale.

V. Side Industries.—Apiculture, sericulture and poultry constitute this item. A large number of Apis indica swarms were captured and domesticated. Pure honey was also extracted by centrifugalling. Both the mulberry and eri silk worms are being reared and yarn spun out from cocoons. Leghorns and Rhode Island Reds are being reared and their eggs are available for sale.

VI. (*a*) *Entomological Work.*—There is an entomological laboratory on the station where the following problems connected with the circle are under investigation—

(i) The sugarcane borer which causes damage to the young shoots in the early stages and to the internodes in the later stages ;

(ii) The ragi borer which causes dead-hearts among the shoots ;

(iii) The sunnhemp caterpillar which defoliates the plants and bores through the pods in bad cases of attack ;

(iv) The pests of citrus and control measures for the same ;

(v) The control of prodenia and aphids on tobacco ;

(vi) The damage caused to stored grain and the best method of storage ;

(vii) Cheap and efficient fly maggot traps.

Insects are also reared to study their life-history and habits.

(*b*) *Mycological Work.*—There is a Mycological laboratory on the station. The incidence of fungoid diseases and their control measures are being investigated.

Visitors are welcome.

Rice Research Station, Berhampur.

The station was opened in the year 1932. It is situated in the Sankarapur village of the Berhampur taluk at the junction of the two roads to Aska and Digupahandi from Berhampur town. The extent of the station is 33 acres.

WHAT TO SEE AND WHEN TO SEE.

May.—Use of the Cooper's iron plough for the first ploughing and the use of H.M. Guntaka.

June-July.—Sowing of green-manure crops of sunnhemp and dhaincha ; raising of thin seed beds of paddy ; preparation and sowing of paddy on broadcast fields.

August.—Ploughing in the green-manures ; use of the iron plough (Cooper's) in the light soil area for puddling ; economic planting of paddy.

September.—Economic planting if rains are late ; utilizing bunds for pulse crops for fodder and grain.

October and November.—All paddy varieties in flower and roguing in seed plots.

December.—Raising of English vegetables in the wet lands, i.e., tomato, knolkhol, etc. ; sowing cotton in the early harvested plots ; ploughing and sowing of pulses for grain and fodder.

January to March.—Different pairu crops—gingelly, ragi, etc.—as additional crop in wet lands ; sowing of indigo and wild indigo for green-manures ; bund scraping to eradicate the grasshopper pest.

April.—Planting of sugarcane.

PROBLEMS UNDER INVESTIGATION.

(*a*) Isolation and maintenance of all definite " Unit species " met with in the course of plant breeding work on the station.

(*b*) Improvement of local varieties of paddy by methods of selection initially and by hybridization to improve upon the defects noticeable in the local varieties.

(*c*) Devoting attention to the general genetics of the rice crop and to clearing up of obscure points in connexion with inheritance of characters.

(*d*) Cultural experiments with the rice crop including (i) optimum spacing, (ii) effect of different ages of seedlings on yield, (iii) broadcast system × transplanting.

(*e*) Manurial trials comprising—

(i) Effect of lime on yield.

(ii) Efficacy of green-manure and the best way of doing it.

(iii) Economics of supplementing green manuring by artificial fertilizers and the nature and doses of such artificials.

(iv) The comparative merits of manuring the seed beds or transplant fields.

(*f*) Besides investigating the possibilities of growing green-manures and fodder crops during December to June small scale trials will be made with regard to growing of pulses, gingelly, cotton, sugarcane and some paying and easily marketable vegetable crops.

Visitors are welcome.

B. RAMAYYA,
Deputy Director of Agriculture.

2 (b). Second Circle.

This circle comprises the districts of Kistna, Guntūr and Nellore, and is in charge of a Deputy Director of Agriculture with headquarters at Guntūr assisted by an Assistant Director of Agriculture at headquarters with jurisdiction in Nellore and Guntūr districts.

(a) Propaganda.

2. The district work in this circle consists in the introduction of suitable manures, improved seeds, iron ploughs, etc., and giving instructions to the ryots in raising green-manure crops, sowing paddy seed-beds at a reduced seed rate, and transplanting paddy where broadcasting is in vogue, jaggery-making and curing turmeric on improved furnaces. Advice is also given on improved methods of cultivation on all the crops in general. If inspection of the land is necessary before giving advice, the Deputy or the Assistant Director of Agriculture will arrange to inspect the place himself or depute one of the Agricultural Demonstrators for this purpose. **Those who require any information on agricultural matters are requested to apply to the Deputy or Assistant Director of Agriculture, Guntur, or to the nearest Agricultural Demonstrator.**

3. In order to popularize improved methods of agriculture, Agricultural Demonstrators have been posted at important centres. As more men become available, it may be possible to extend their usefulness to other centres. It is the duty of the demonstrators to tour in the taluks in order to help the ryots in getting them manures, seeds, ploughs, etc., and to give advice on all agricultural matters. At present demonstrators have been stationed in the following places with a depot attached to each for stocking seeds, implements, etc. :—

Kistna District.

Taluk.	Headquarters.	Centres of work.	Taluks without demonstrators.
1. Bandar ...	Masulipatam ...	Masulipatam, Gudur, Pedana, Nandamur and Challapalli.	Divi, Tiruvur Division, Gudivada and Nuzvid.
2. Kaikalur ... Gudivada ...	Kaikalur ...	Ayyavari—Rudravaram, Narasayapalem and Locamudi. Siddhantam (Gudivada taluk).	
3. Bezwada ...	Bezwada ...	Bezwada, Kankipad, Kondapalli and Mylavaram.	
4. Gannavaram ...	Gannavaram ...	Mustabada, Pottipad, Kanumole and Nandamur.	
5. Nandigama ...	Nandigama ...	Nandigama, Kanchikacherla, Jaggayyapet and Penukanchiprole.	

Guntur District.

Taluk.	Headquarters.	Centres of work.	Taluks without demonstrators.
1. Guntūr ...	Guntūr	Mangalagiri, Nutakki, Pothur, Prattipad and Guntūr.	Repalle, Ongole, Sattenapalli and Narasaraopet.
2. Tenali ...	Tenali	Tenali, Duggirala, Kollipara, Chiluvur and Pedapalem.	

Taluk.	Headquarters.	Centres of work.	Taluks without demonstrators.
	Guntur District—*cont.*		
3. Bapatla ...	Bapatla	Bapatla, Nidubrole, Mamillapalli, Jammulapalem and Parchur.	Repalle, Ongole, Sattenapalli and Narasaraopet.
4. Vinukonda ...	Vinukonda ...	Vinukonda, Iyanavole, Pedakancherla and Savalyapuram.	
5. Palnad ...	Gurzala ...	Gurzala, Dachepalli, Karempudi and Macherla.	
	Nellore District.		
1. Kavali ...	Kavali	Kavali, Kaligiri, Chinakraka and Bitragunta.	Kanigiri, Darsi, Podili, Udayagiri, Polur, Rapur, Venkatagiri and Kovur.
2. Nellore ...	Nellore	Ipur, Mulamudi, Indukurpet, Totapalligudur and Brahmadevam.	
Kovur ...	Nellore	Vidavalur, Dandigunta, Allur, Kovur and Buchireddipalem.	
3. Atmakur ...	Atmakur ...	Atmakur, Vasili, Kartampad and Devarayapalli.	
4. Gudur ...	Nayudupeta ...	Nayudupeta, Sulurpet, Tada, Gudur and Kota.	
5. Kandukur ...	Kandukur ...	Kandukur, Karedu and Pokur.	

Seeds of improved strains of paddy, jonna, etc., evolved by the department and other agricultural requisites are stocked for sale in the depots. In these depots, leaflets, bulletins and villagers' calendars are also available. **List of articles in stock and their prices can be had on application to the officer in charge.**

4. The Agricultural Department is working in co-operation with the Co-operative Department. The ryots can take advantage of this and arrange for the co-operative purchase of seed, manure and implements. Those who seek advice on matters relating to co-operative societies should apply to the Deputy Registrar of the district concerned. Those who seek information as regards boring and sinking wells, or installing engines or pumping installations, should apply to the Assistant Industrial Engineer, Bezwada.

(b) Research.

Agricultural Research Station, Guntur.

5. This station is five miles away from the Guntūr town on the Guntūr-Amarāvati road. It was opened in May 1922. It is a dry land farm about 150 acres in extent. Experiments to improve cotton, tobacco, chillies and millets are conducted. About 150 acres are reserved as grazing area for the small herd of Delhi breed of buffaloes and Ongole cattle maintained at the station for breeding purposes.

What to See.	When to See.
1. The use of improved ploughs	Throughout the year.
2. The use of seed drills and drilling crops—	
(*a*) Punasa or early season crop	June-July.
(*b*) Pairu or late season crop	October-November.

3. Treating of cereal seeds with sulphur dust against smut—	
Punasa crops	June-July.
Pairu crops	October-November.
4. Preparation of nursery beds and raising seedlings—	
Chillies	First fortnight of July.
Tobacco	First fortnight of August.
5. Intercultivation of early crops with papadams.	July-August.
6. Sowing of cotton in Akkadis behind Gorru.	First fortnight of September.
7. Marking of lines, preparation of land and transplanting—	
Chillies	September.
Tobacco	October.
8. Intercultivation of cotton, chillies and tobacco with the Planet Junior Hoe.	October-January.
9. Harvest of groundnuts with the improved H.M. Guntaka.	November-December.
10. Clean picking of cotton	February-March.
11. Harvesting and curing of tobacco ...	February-March and April.
12. Summer cultivation—	
(*a*) Ploughing with mould-board ploughs.	December-January and February.
(*b*) Frequent working of Guntaka to keep the fields clean and free of weeds.	February-March and April.
13. Selection of seed and preservation ...	A fortnight previous to the harvest of crops.
14. Use of hand chaff-cutter for chaffing fodder and feeding cattle.	Throughout the year.
15. Preparation of cattle manure, loose-box system.	Do.
16. Preparation of vegetable composts ...	Any time during the year.
17. Fodder crops, guinea grass and elephant grass.	Do.

6. Problems on which work is conducted—

(*a*) Plant breeding—Evolving suitable strains of cotton, jonna and chillies by pure line selection.

(*b*) Introduction of Cambodia cotton and sugarcane in dry land.

(*c*) Manurial trials on chillies, tobacco, variga and cotton with ammonium sulphate and superphosphate.

(*d*) Investigation of remedial measures against thrips on chillies.

(*e*) Cattle breeding—Scientific breeding of pure Delhis and cross-bred Delhi buffaloes and Ongole cattle and improved methods of rearing and feeding of cattle.

Visitors are quite welcome to the Agricultural Research Station and they will be shown round by the farm staff. The best time to visit the Station is December-January.

K. GOPALAKRISHNA RAJU,
Deputy Director of Agriculture.

List of Articles available for Sale in the Depots.

	Price. RS.	A.	P.	
Pillipesara	1	0	0	26 lb.
Dhaincha	0	1	0	per lb.
Vempali	0	0	9	,,
Seeds of paddy strains such as G.E.B. 24, Kusuma C, Akkulu 34 and Adt. 3.	0	0	6	,,

Implements.

Cooper plough, No. 25	4	8	0	each.
Spare share for the above	0	5	6	,,
Cooper plough, No. 26	8	12	0	,,
Spare share for the above with point ...	1	1	0	,,
Spare points for No. 26 plough	0	3	6	,,
Cooper plough, No. 11	7	0	0	,,
Spare share for the above	0	9	0	,,
H.M. Guntaka No. 0— Iron work only, with 6″ straight blade ...	4	8	0	,,
H.M. Guntaka No. 1— Iron work only, with 15″ curved blade ...	8	0	0	,,
H.M. Guntaka No. 2— Iron work only, with 24″ curved blade ...	14	4	0	,,

Spare Blades for above Guntakas.

6″ straight blades with one lug	1	8	0	each.
9″ do.	2	0	0	,,
12″ do.	2	4	0	,,
12″ curved blade with one lug	2	6	0	,,
15″ do.	2	12	0	,,
18″ straight blade with one lug	3	2	0	,,
24″ curved blade with two lugs	3	14	0	,,
36″ straight blade with two lugs	5	8	0	,,
48″ do.	6	0	0	,,

2 (c). Third Circle.

1. The Third Circle comprises Bellary, Anantapur, Kurnool and Cuddapah districts. It is in charge of a circle officer whose headquarters is at Bellary. He is assisted by two Assistant Directors of Agriculture stationed at Bellary and Kurnool. The Assistant Director of Agriculture, Bellary, is in charge of district work in Bellary and Anantapur districts, and the Assistant Director of Agriculture, Kurnool, is in charge of the work in Kurnool and Cuddapah districts.

(a) Propaganda.

2. In order to help the ryots, agricultural demonstrators are touring in the districts, but their number is limited owing to the lack of trained men. There are still 17 taluks in this circle without demonstrators in charge.

Below is given a list showing the distribution of the demonstrators in this circle, their jurisdiction and headquarters :—

A.—Taluks with Demonstrators.

Bellary District.

Taluk.	Headquarters.	Centres of demonstration.
Bellary ...	Bellary ...	Moka, Kudatini, Bevinahalli and Bellary.
Hospet	Hospet	Kampli, Kamalapuram, Kurukuppi and Chittwadigi.
Kudligi	Kudligi	Bandri, Kottur and Kudligi.
Siruguppa	Siruguppa	Karur, Siruguppa and Sirigeri.
Adōni ...	Adōni ...	Kowtalam, Ramapuram, Yemmiganur and Madari.

Anantapur District.

Gooty ...	Gooty ...	Pamidi, Uravakonda and Gooty.
Gooty ..	Guntakal	Bantanahalu of Alur taluk of Bellary district, and cotton work round about Guntakal.
Kadiri ...	Kadiri ...	Obaladevarcheruvu, Tanakallu and Kadiri.
Hindupur	Hindupur	Chowlur, Cholasamudram, Hindupur and Palasamudram.
Anantapur	Anantapur	Singanamala, Atmakur, Anantapur and Kallumadi.
Tadpatri	Tadpatri	Tadpatri, Yerraguntlapalle, Puthuru and Rayalcheruvu.

Kurnool District.

Dhone	Dhone	Venkatapuram, Dhone, Veldurti and Betamcherla.
Kurnool	Kurnool	Kurnool, Gopalasingavaram, Kalva, Gadidamadugu, Kodumur and Narnur.
Nandyal	Nandyal	Nandyal, Panyam, Kondajutur, Thimmapuram (Mahanandi) and Pasalur.
Cumbum	Giddalore	Giddalore, Komarolu, Cumbum, Gundereddipalli, Somadevipalli and Pusalapad.
Sirvel ...	Allagadda	Deebaguntla, Sirvel, Allagadda and Chagalamarri.
Nandikotkur	Atmakur	Atmakur, Bannur, Nandikotkur and Pamulapad.
Koilkuntla	Koilkuntla	Koilkuntla, Owk, Nozzam and Dornipad.

Note.—There is also a demonstration maistri posted at Dhone for work under the Venkatapuram tank.

A.—Taluks with Demonstrators—*cont.*

Cuddapah District.

Taluk.	Headquarters.	Centres of demonstration.
Cuddapah ...	Cuddapah ...	Chennur, Cuddapah, Khajipet, Kamalapuram, Vellatur and Chintakommadinne.
Proddatur ...	Proddatur ...	Proddatur, Mydukur, Duvvuru, Vanipenta and Chinnadaradlur.
Rajampet ...	Nandalur ...	Rajampet, Koduru, Nandalur and Penagaluru.

B.—Taluks without Demonstrators.

Bellary District.—Alur, Hadagalli, Harpanahalli and Rayadrug.

Anantapur District.—Dharmavaram, Kalyandrug, Madagasira and Penukonda.

Kurnool District.—Markapur and Pattikonda.

Cuddapah District.—Badvel, Jammalamadugu, Kamalapuram, Pulivendla, Rayachoti and Siddhavattam.

3. The district work in this circle consists chiefly in the propagation and distribution of improved strains of cotton such as H. 1 and N. 14 evolved at the Agricultural Research Stations, Hagari and Nandyal, respectively. Co. 2 strain of Cambodia cotton from Coimbatore district has also been introduced in this circle. Seeds of T. 8 ragi and T. 1 cholam evolved at the Research Station, Hagari, and T. 6 cholam evolved at the Agricultural Research Station, Nandyal, are also being supplied to ryots. The agricultural demonstrators are also supplying seeds of improved strains of paddy such as GEB. 24 and setts of improved varieties of sugarcane.

Improved methods of cultivation such as ploughing the land with suitable iron ploughs and working the land with efficient and labour-saving implements such as the H.M. Guntaka are demonstrated on ryots' own lands. Improved methods of planting sugarcane in trenches instead of in flat beds and better methods of manufacture of jaggery with suitable devices such as improved furnace are demonstrated in sugarcane growing areas.

Proper collection and preservation of cattle manure forms one of the most important items of propaganda. The advantages of adopting the loose-box method of collecting cattle manure and using all the available litter as manure are constantly brought to the notice of the ryots. Preparation of organic compost with groundnut husk, dry leaves and cholam stubbles is also demonstrated.

Ryots who grow improved strains of crops with seed distributed by the Department are given all facilities to sell their produce at better prices.

Advice is also given on pests and diseases of crops. One whole-time assistant for advising ryots on control measures to be adopted against insect pests and fungoid diseases is stationed at Bellary. If inspection is necessary, this will be done free of cost. Those who require information on agricultural matters or supply of seeds, etc., should either apply to the nearest Agricultural Demonstrator or to the Assistant Director of Agriculture concerned.

4. A list of departmental depots in this circle with the kind of seed stocked in them is given. The current prices can be ascertained from the agricultural demonstrators in charge of the depots.

Bellary District.

Depots.	Articles stocked.	Depots.	Articles stocked.
Bellary ...	H. 1 cotton seed. Sunnhemp.	Siruguppa ...	H. 1 cotton seed. Sunnhemp. GEB. 24 paddy.
Hospet ...	GEB. 24 paddy. Sunnhemp. T. 8 ragi seed. T. 1 cholam.	Kudligi ...	H. 1 cotton seed. T. 8 ragi. GEB. 24 paddy. Sunnhemp.
Adoni ...	H. 1 cotton seed.		

Anantapur District.

Guntakal ...	H. 1 cotton seed.	Tadpatri ...	Same as Gooty.
Gooty ...	H. 1 cotton seed. GEB. 24 paddy. Sunnhemp. T. 8 ragi. T. 1 and T. 6 cholam. Onion seed. Bonemeal.	Anantapur ...	Same as Gooty.
		Kadiri ...	T. 8 ragi. GEB. 24 paddy. Sunnhemp.
		Hindupur ...	GEB. 24 paddy. T. 8 ragi. T. 1 cholam. Sunnhemp.

Kurnool District.

Kurnool, Nandyal, Giddalore, Cumbum and Allagadda.	N. 14 cotton seed. Cambodia cotton seed. Sunnhemp seed. GEB. 24 paddy seed. Co. 1 paddy seed. T. 6 cholam seed. Dhaincha seed. Abridged Report of Royal Commission on Agriculture (Telugu edition) ... ... Rs. 1-8-0.

					Rs.		
Kurnool ...	H.M. Guntaka	No. 0	Iron parts only	Rs.	4	8	0
			Spare blades 6″	,,	1	8	0
Nandyal ...	Do.	No. 1	Iron parts only	,,	8	0	0
			Spare blades 15″	,,	2	12	0
Giddalore ...	Do.	No. 2	Iron parts only	,,	14	4	0
			Spare blades 24″	,,	3	14	0
Cumbum ...	Cooper plough	No. 25	Iron parts only	,,	4	8	0
			Share each ...	,,	0	5	6
Allagadda ...	Do.	No. 26	Iron parts only	,,	10	12	0
			Shares with point	,,	1	1	0
			Point	,,	0	3	6

Cuddapah District.

Depots.		Articles stocked.
Cuddapah	...	Same as in the depots of Kurnool district except—
Proddatur	...	N. 14 cotton seed
Rajampet	...	H. 1 cotton seed

Note.—Copper sulphate packets and Villagers' Calendars are available in all the above depots at one anna each.

5. **Co-operative Department.**—There are two Deputy Registrars of Co-operative Societies in this circle, one with headquarters at Bellary having jurisdiction over the Bellary and Kurnool districts and the other with headquarters at Anantapur having jurisdiction over the Anantapur and Cuddapah districts. In each district there is a Sub-Deputy Registrar. All those who seek advice on matters relating to co-operative societies may apply to these officers. The Agricultural and Co-operative departments are working together, especially with regard to non-credit work, and attempts are being made to transfer seed distribution, co-operative ginning and co-operative sale of cotton to the co-operative loan and sale societies started at Bellary, Adōni and Nandyal and the Agricultural Improvements Society at Bantanahal.

6. **Department of Industries.**—The Assistant Industrial Engineer who has his headquarters at Bezwada has jurisdiction over Bellary and Kurnool districts, while the Assistant Industrial Engineer, who has his headquarters at Coimbatore has jurisdiction over Cuddapah and Anantapur and all those who want any information on boring and sinking wells and installation of engines may apply to him.

(b) Research.

There are two agricultural research stations in this circle, one at Hagari in Bellary district, and the other at Nandyal in Kurnool district.

Agricultural Research Station, Hagari.

This station was started in the year 1906–07. It is about a mile and a half south of the Hagari railway station on the Southern Mahratta Railway occupying lands in the villages of Paramadevanahalli and Kaggal. It is only about 10 miles from Bellary town and can be reached easily either by train or motor buses plying on the Bellary-Gooty road. The station as now constituted is 318 acres in extent of which about one half is under regular cultivation, the rest being sandy waste which has been gradually converted into moderate pasture land. Of the 155·34 acres of the cultivated area, about 14 acres are irrigable from a small well near the sand dune area, the rest is all black cotton soil in which unirrigated cotton and sorghum are the principal crops grown. These sand dunes are caused by the accumulation of sand blown from the dry river bed during the prevalence of strong winds of the south-west monsoon. The sand dunes themselves are partly underlain by black cotton soil and in some portions beds of dark alluvial sandy loam are found with thin beds of clay at distances varying from 2 to 15 feet below the surface.

2. November-December are the months in which crops may be seen standing on almost the entire area of the station. Visitors at this period will also be able to gather an idea of how the evolution of better strains of

cotton and cholam is worked at the station. Better methods of collection and preservation of cattle manure, and methods of increasing the output of manure by adding litter in the cattle stalls and by the preparation of organic compost with all available waste matter such as dry leaves, cholam stubbles, etc., can be seen at all times during the year. Visitors will also be able to see how the sand dunes have been converted into pasture land with useful trees such as babul. Detailed information on the important operations and crops that can be seen at different periods of the year is furnished below for the benefit of visitors :—

3. The station is mainly devoted to the solution of problems connected with cultivation, manuring and cropping of black cotton soil and the improvement of two most important crops of the locality, viz., cotton and cholam by evolving better strains. The H. 1 cotton evolved at this station, and seeds of which are supplied to the ryots year after year is a good drought-resisting strain, gives a higher yield than the local variety, and its lint is of a fine quality valued in the local market at Rs. 15 to 25 per bale above the local Hingari cotton. T. 1 cholam which was also evolved at this station is popular with the ryots as it is superior to local cholam in yield as well as in quality of grain and straw. A small area is devoted to the cultivation of "garden" crops, e.g., ragi, Cambodia cotton, onions, maize, etc., with the object of showing the local cultivators that garden cultivation can be very profitable if properly attended to. T. 8 ragi is a strain evolved at this station, and it yields heavier than the local variety. Further selection work is in progress on this and other crops with a view to obtain still better strains.

The optimum spacing to be given between lines of crops, especially cholam, is under study. The results of last year indicate that higher yields are possible with wider spacing. The conservation of soil moisture, especially in these districts of precarious rainfall is another important problem that is under investigation at the station. For want of sufficient cattle manure the ryots are able to manure only a small part of their holdings near the village in rotation, and the rest of the holding never receives any manure. Experiments are therefore in progress at the station to find out ways and means of remedying this defect. The effect of cattle manure stored in different methods is under study. The possibilities of the use of artificial manures such as ammonium sulphate and superphosphate in conjunction with cattle manure both by direct as well as indirect manuring on the two most important crops of the locality, viz., cotton and cholam, are also under investigation.

April to June.—Removal of cotton stalks with H.M. Guntaka No. 2. Working of the *Pedda Guntaka* after the mid-summer rains in fields ploughed after sorghum. Fallow cultivation with improved implements. Levelling of land with buck scraper. Preparation of compost after conserving all available organic waste material.

June.—Raising thin ragi nursery and sowing of fodder crops in the irrigated area.

July.—Transplanting ragi and sowing of fodder crops in the irrigated area. In dry land Italian millet and groundnut are sown if the season is early. The bund-former will be at work in the last two weeks of the month to arrest to run off and conserve moisture in the dry lands.

August.—According to the nature of the season Italian millet and groundnut will be sown. In the garden land a short crop of sugarcane will be planted.

September.—Ragi can be seen at its best in this month. Cotton is sown in this month.

October.—Sorghum will be sown in about the first week of this month after the cotton sowings. Bengal gram, safflower and wheat are usually put in at the end of the month.

November.—Ragi will be harvested. Onion, tomatoes and other vegetables will be planted. Maize for fodder will be sown. In the dry land implements for interculture will be at work.

December.—Early in the month groundnuts will be harvested by the improved implements. This is the best time to visit the station when many crops will be standing.

January.—Final interculture operations for the dry crops will be done. In the latter half of the month fodder maize will be cut and ensil-aged.

February.—Sorghum harvest will be started in the second half of the month. Sugarcane will be planted and harvested.

March.—Threshing of the produce of the season and the use of the winnowing machine may be seen. The picking of cotton will close in this month. Ploughing of fields after the removal of cereal crops.

Agricultural Research Station, Nandyal.

This station is situated about half a mile from the Nandyal railway station on the Guntakal-Bezwada line of the Madras and Southern Mahratta Railway and lies in the angle formed by the Cumbum-Kurnool and the Nandyal-Koilkuntla roads. The station was started in the year 1906. It now comprises an area of about 92 acres of which one half was acquired in the year 1911. The soil is a very dark loamy clay overlaying a very stiff yellow clay which dries on exposure into hard granite-like lumps.

2. November-December are the best months for visitors to the station as there will be standing crops in all the fields and intercultural operations will also be in progress. How selection work on cotton, cholam, groundnuts and other crops is carried on can be seen in the months of September-March.

The collection and preservation of cattle manure, preparation of organic compost with dry leaves and cholam stubbles and methods of housing and feeding cattle including calves and breeding bulls can be seen at all times during the year.

Information concerning the crops that can be seen and various operations that will be in progress at the station at different periods of the year is furnished below:—

January.—Harvest of improved strains of cholam and threshing ear-heads with stone roller. Standing crops of cotton, vegetables and Bengalgram.

February.—Clean picking of kappas, threshing of Bengal gram with stone roller, winnowing and cleaning of threshed produce with hand win-nowing machine. Standing crops of cotton and vegetables. Harvest of Bengal gram.

March to May.—Deep ploughing with heavy iron ploughs. Work-ing of H.M. Guntaka No. 2 to remove cotton and cholam stubbles, use of

stubble gatherer for the collection of cholam stubble for the preparation of compost. Standing crops of sugarcane, cotton and vegetables.

June.—Preparation of deep-ploughed area by working stone-roller and cart frame to get ready for sowing. Drilling of cholam and *pillipesara* for fodder and the raising of green manure crops and vegetable nurseries. Standing crop of sugarcane.

July.—Sowing of groundnut and Italian millet with a drill. Standing crops of sugarcane, fodder cholam, *pillipesara* and green manure.

August.—Drill sowing of cotton--Standing crops of sugarcane, fodder cholam, *pillipesara*, green manures and groundnut. Ploughing in of green manure.

September.—Sowing of cholam with a drill. Planting of vegetable crops, standing crops of cotton, sugarcane, fodder cholam, *pillipesara* and groundnut.

October.—Intercultivation of cotton and cholam. Preparation of silage with fodder cholam. Standing crops of cholam, cotton, vegetables, sugarcane, *pillipesara* and groundnut.

November-December.—Sowing of Bengal gram with a drill, standing crops of cholam, cotton, vegetables, sugarcane, *pillipesara*, Bengal gram Harvest of groundnuts with H.M. Guntaka.

3. The main work on the station is the isolation and testing of pure strains of cotton, cholam, groundnut, Italian millet (*korra*) and other minor crops.

A study of the manurial problems based on the needs of the tract has also been started on cotton and cholam with both artificial and organic manures. A rotation experiment to include groundnut in the local cotton cholam rotation is under study.

Visitors are welcome.

A. C. EDMONDS,
Deputy Director of Agriculture.

2 (d). Fourth Circle.

This circle comprises the Chingleput, South Arcot, North Arcot and Chittoor districts and is in charge of a Deputy Director of Agriculture with his headquarters at Saint Thomas' Mount (P.O. and railway station). He is assisted by two Assistant Directors of Agriculture stationed one at Cuddalore for South Arcot and Chingleput districts and the other at Vellore for North Arcot and Chittoor districts.

(a) Propaganda.

Most of the taluks have their own demonstrator working under the Assistant Director of Agriculture. A few suitable villages in each taluk are selected for concentrated work. The Agricultural Demonstrator introduces all improvements in the ryots' methods in each of these centres of concentrated work. His aim is to convert all the villagers of the central village to the new methods. The demonstrator is, in most cases, assisted by the demonstration maistri. Each demonstrator has a depot at his headquarters.

General items of improvements are—

(1) The proper conservation of farmyard manure without wasting any part of it and preparation of compost.

(2) The use of green-manure crops and their cultivation.

(3) The more extended use of concentrated manures.

(4) The spread of the use of improved implements that save labour.

(5) Introducing improved strains of paddy, with reduction of seed rate both in nursery and in the field with better manuring.

(6) Introduction of sugarcane in new tracts and improved varieties of sugarcanes all over with better manuring and cheaper methods of cultivation and jaggery manufacture.

(7) Establishment of trial plots and demonstration plots and opening seed farms for paddy and green-manure seeds, etc.

(8) Conducting exhibitions to demonstrate the improved methods with and without lantern lectures.

(9) Intensive farming of all kinds to improve the economic position of the farmer.

(10) Fruit cultivation, the poultry farming, etc., as side lines of agriculture.

(11) Improving the local cattle by directing the ryots to have their cows covered by bulls of known pedigree stationed at the various places given below.

(12) Assisting the ryots in the disposal of their groundnut produce through Co-operative Societies in South and North Arcot districts.

The demonstrators generally attend to reports on pests and diseases. Important cases of the sort will be attended to by the special demonstrators in Entomology and Mycology attached to the circle.

Co-operative Department.—There is a Sub-Deputy Registrar at Madras for Chingleput district and the headquarters of the Deputy Registrar for the district is also Madras. South Arcot has its Deputy Registrar and Sub-Deputy Registrar at Cuddalore N.T. The headquarters of the Deputy and Sub-Deputy Registrars of Co-operative Societies for North Arcot district is at Vellore. The Chittoor district is under the Deputy Registrar of Nellore while the Sub-Deputy Registrar has the headquarters at Chittoor.

Industries Department.—There is a Supervisor of Industries for South Arcot with headquarters at Cuddalore. The Assistant Industrial Engineer of South Arcot has his headquarters at Tanjore while the officer for Chingleput has his headquarters at Madras. The Assistant Industrial Engineer, Coimbatore, has jurisdiction over North Arcot and Chittoor districts. There is a Supervisor of Industries for Chittoor and North Arcot districts with headquarters at Vellore.

CUDDALORE DIVISION.

A.—Taluks with Demonstrators.

Chingleput District.

Taluk.	Headquarters.	Centres of work.
Conjeeveram ...	Conjeeveram ...	Conjeeveram, Uttiramerur, Magaral, Damal, Tenneri and Palayasivaram.

CUDDALORE DIVISION—*cont.*

A.—Taluks with Demonstrators—*cont.*

Chingleput District—cont.

Taluk.	Headquarters.	Centres of work.
Madurantakam.	Madurantakam ...	Madurantakam, Sithamur, Nelvoy and Cheyur.
Chingleput ...	Chingleput ...	......
Tiruvallur ...	Tiruvallur ...	Tiruvallur, Kadambattur, Velliyur and Perambakkam.
Saidapet ...	Saidapet	Porur, Selaiyur, Konnur and Polal.

South Arcot District.

Tindivanam ...	Tindivanam ...	Tindivanam, Mailam, Rettanai and Olakur.
Vriddhachalam.	Vriddhachalam ...	Pennadam, Vriddhachalam, Mangalampet and Tittagudi.
Cuddalore ...	Cuddalore N.T. ...	Cuddalore N.T., Panruti, Kilalingapet, Nellikuppam and Kullanchavadi.
Villupuram ...	Villupuram ...	Valavanur, Villupuram, Nemur and Vikravandi.
Kallakurichi ...	Kallakurichi ...	Kallakurichi, Sankarapuram, Torasalur and Chinnasalem.
Chidambaram.	Chidambaram ...	Chidambaram, Porto Novo, Palayamkottai, Satiatope and Mannargudi.
Tirukkoyilur ...	Tirukkoyilur ...	Pazhankur, Veerapandy, Sirumadurai and Senkurichi.

B.—Taluks without Demonstrators.

Chingleput district ...	Sriperumbudur taluk and Ponneri taluk.
South Arcot district ...	Gingee taluk.

VELLORE DIVISION.

A.—Taluks with Demonstrators.

North Arcot District.

1. Vellore ...	Vellore...	Allivaram, Sanarkuppam, Agaram and Alamelumangapuram.
2. Gudiyattam ...	Gudiyattam	Yerikuti, Kavanur, Kottamitta and Brahmapuram.

VELLORE DIVISION—*cont.*

A.—Taluks with Demonstrators—*cont.*

North Arcot District—cont.

Taluk.	Headquarters.	Centres of work.
3. Polur	Polur	Kalambur, Santavasal, Vellur, Somanthaputhur and Elathur.
4. Tiruvannamalai.	Tiruvannamalai ...	Pennathur, Verayur, Turinjipuram, Mangalam and Konalur.
5. Wallajah ...	Wallajah	Talangai, Nathapakkam, Ramapalaiyam and Kadaperi.
6. Tiruppattur ...	Tiruppattur	Pudupet, Vaniyambadi, Vishamangalam, Kakangarai.
7. Tiruvettipuram or Cheyyar.	Tiruvettipuram ...	Pallavaram, Kalanipakkam, Seyattuvendram and Mornam.

Chittoor District.

Taluk.	Headquarters.	Centres of work.
1. Chittoor ...	Chittoor	Dasaripalle, Tavanapalli Sadam, Gangadharanallur, and Mittur.
2. Madanapalle ...	Madanapalle	Rachavetivaripalli, Vempalle, Mulacalcheruvu, and Peddatippasamudram.
3. Palmanēr ...	Palmanēr	Samudrapalli, Kallupalle, Bunisettipalli, Bandapalli, and Sivinikuppam.
4. Tiruttani ...	Tiruttani	Arcodkuppam, Athimanjeri, Chevurambakkam, Upparapalli and Karvetinagaram.

B.—Taluks without Demonstrators.

North Arcot district	Arni, Arkonam, Wandiwash and Chengam.
Chittoor district	Punganūr, Kuppam, Kalahasti, Chandragiri, Vayalpad, and Puttur.

List of Breeding Bulls.

	District.		Place.	Breed of bull.	Remarks.
1.	North Arcot	...	Tiruvettipuram, Cheyyar taluk.	Ongole No. 20.	
2.	Do.	...	Katpadi Mission Farm ...	Kangayam No. 74.	
3.	Do.	...	Serukadur village ...	Do. No. 101.	
4.	Do.	...	Surankuppam, Gudiyattam taluk.	Kangayam.	
5.	Do.	...	Yerantangal, Gudiyattam taluk.	Do.	
6.	Do.	...	Katpadi Mission Farm ..	Scindhe No. 100.	
7.	Do.	...	Katpadi Industrial School.	Kangayam No. 109.	
8.	Do.	...	Melpadi	Do. No. 102.	
9.	Chittoor ...	...	Rishi Valley Trust, Madanapalle.	Ayreshire cross.	
10.	Do. ...	...	Madanapalle Veterinary Hospital.	Kangayam No. 25.	

List of Breeding Bulls at Madras.

1. Scindhe No. 13.
2. Ongole No. 97.
3. Ayreshire--Scindhe Saniwal No. 177.
4. Ayreshire Ongole No. 150.
5. Ayreshire.
6. Buffaloe bulls (3).

1.	Chingleput District.	Melrosapuram, Chingleput.	Scindhe No. 24.
2.	Do. ...	Veterinary Hospital, Conjeeveram.	Ongole No. 38.
3.	South Arcot District.	Aziznagar Settlement ...	Kangayam No. 25.

List of articles for cash sale at the depots—

Name of article.	Name of article.
H.M. Guntaka No. 0.	Pillipesara.
H.M. Guntaka No. 1.	Sunnhemp seeds.
H.M. Guntaka No. 2.	Paddy seeds—Short duration.
Cooper plough No. 25.	Long duration.
Spare share.	Crude oil emulsion.
Cooper plough No. 26.	Fish oil soap.
Spare share with point.	Lead arsenate.
Spare point alone.	Paris green.
Kolinji seeds.	Villagers' Calendar.
Dhaincha seeds.	Bulletins.

Prices fluctuate according to market rate and can be had on application to the nearest demonstrator or Assistant Director of Agriculture.

Most of them are available in the depot. But when any one is not available the purchaser has to pay the price in advance and wait for the receipt of the article from a distant source.

Advice is given free regarding all agricultural matters.

(b) Research.

Agricultural Research Station, Palakuppam, Tindivanam P.O.

The Agricultural Research Station, Palakuppam, Tindivanam P.O., is situated on the Tindivanam-Gingee road and is three miles from Tindivanam railway station. The station was opened in June 1925 on land leased for 10 years. It consists of 12 acres of dry land and 4 acres of garden land. Experiments on the breeding and cultivation of oil seed crop like groundnut, castor and gingelly form the important work of this station.

What to See and When to See.

January.—Standing crops of rainfed gingelly, castor, horsegram and ragi; harvest of rainfed long duration groundnuts and castor.

February.—Standing crops of rainfed gingelly and castor; harvest of horsegram, ragi and castor.

March-May.—Fallow cultivation of all the dry lands by improved implements; sowing irrigated gingelly; harvest of rainfed gingelly and pulling out castor.

June-July.—Sowing rainfed groundnut and castor varieties; drill sowing of rainfed cumbu; harvesting of irrigated gingelly.

August.—Standing crops of groundnut, castor and cumbu.

September.—Standing crops of groundnut and castor; harvest of cumbu.

October.—Sowing of horsegram and ragi; standing crops of groundnut and castor; harvest of short duration groundnut.

November-December.—Sowing rainfed gingelly; standing crops of long-duration groundnuts, castor, horsegram and ragi.

Agricultural Research Station, Palur, South Arcot District.

The Agricultural Research Station, Palur, is situated on the Cuddalore-Panruti road and is 5 miles from Nellikuppam railway station. The station was opened in 1905. Of the 51 acres of cultivable area, 32 acres are irrigable dry lands and about 19 acres are wet lands.

What to See and When to See.

The best time to visit the station is October when almost all the fields are full with standing crops.

The Archimedean Screw for short lifts, improved circular mhote, coopers persian wheel water lift, ball bearing mhote wheel, care and systematic feeding of animals, and conservation of cattle manure and urine in loose-box stalls, can be seen at all times during the year. White leghorn which are noted for their egg production and Light Sussex and Rhode Island Reds noted for the table are being reared and young chicks are sold to the public at moderate prices.

Good edible fish with less bones are being reared in the farm wells.

Eri silk worms in all stages and spinning of eri silk can be seen at all times, except during April and May.

January-February.—Ploughing the lands for ragi and groundnut with mould board ploughs, forming beds and channels with the bund forming implement, sowing groundnuts and planting ragi, opening trenches with double mould board plough for planting sugarcanes, picking sugarcane setts, planting of sugarcanes in trenches, harvest of rainfed groundnut, paddy varieties and picking kappas. Winnowing machine will be at work.

March-April.—Harvesting of sugarcanes and crushing them by the power mill, manufacture of cream and ordinary jaggery, rab and white sugar will be in progress. The double Sindhewahe furnace will be at work, Threshing ragi with stone roller may be seen. Intersowing groundnut in ragi and standing young crops of plantain, varieties sugarcanes and groundnuts can be seen.

May.—Working H.M. Guntaka to eradicate korai; preparation of nurseries and thin sowing of paddy in seed beds, intercultivating sugarcanes with Junior hoe, yoked to a single bullock may be seen. Standing crops are green-manure crops like daincha and sunnhemp, groundnuts, sugarcane and plantains. Light traps may be seen kept at nights for attracting "surul poochi" an insect damaging groundnut crops.

June-July.—Ploughing in green-manure crops, with Hindustan ploughs, transplanting first crop paddy varieties in singles, earthing up sugarcanes with Hindustan plough after the second manuring, harvest of irrigated groundnuts and standing crops of green-manure crops, sugarcanes, etc.

August.—Drilling semi dry paddy varieties, ploughing in green-manure crop with Hindustan plough in the wet lands, sowing Cambodia cotton on ridges, final earthing up of canes and intercultivating with danti or H.M. Guntaka No. 0. Standing crops are cumbu, cholam, first crop paddy, sugarcanes, plantains and single plant selections in wet land blocks. Preparation and planting of sugarcanes for rapid propagation (short crop) can also be seen.

September.—Laying out comparative and manurial trials in the wet lands and planting seedlings in lines. Application of bonemeal to supplement green manure for paddy. Harvest of first crop paddy varieties. Preparation of land for second paddy crop. Propping canes, using the pitting crowbar and wires and bamboos. Harvesting cumbu stalks with the reaping machine.

November-December.—Planting second crop paddy varieties. Sowing green manure in fields to be planted with sugarcanes. Standing crops are paddy, sugarcane, plantains, etc.

PROBLEMS UNDER INVESTIGATION.

Paddy.—(1) Comparative trials of single plant selections from important local varieties.

(2) Comparative trials of semi-dry paddy varieties.

(3) Effect of application of inorganic phosphates and bone-meal in addition to green manure.

Sugarcanes.—(1) Efforts were made in the past to introduce different types from foreign countries. The imported varieties deteriorated in due course and to meet the demand for better canes, systematic study of several seedlings and their comparative trials are in progress. Sugarcane varieties that are able to resist disease, drought and waterlogging conditions; those that possess high sucrose content and high yielding capacity are under trial.

(2) Besides the sound seed material, manures play an important part in the production of canes. Experiments are in progress to find out (*a*) the quantities of phosphates and potash required for maximum production and (*b*) the effect of sodium nitrate as nitrogen supplier with or without organic manures.

Experiments are also in progress regarding—

(1) Economics of ratooning canes.

(2) The advantages of applying manures in pits round the cane stools.

(3) Effect of restricted irrigations on the quantity and quality of drought-resisting canes like Co. 213, Co. 281 and Co. 285.

(4) Sorghum hybrids which mature in about six to eight months yielding about as much as the local canes are being raised in all months to find out the suitable season for growing them in this tract.

(5) Trials of rapid multiplying of cane setts by short-crop method are in progress. The setts obtained from such crops are quick and better germinators.

(6) With a view to introduce better strains, comparative trials of groundnut, gingelly and ragi are also in progress.

(7) Water requirements of all the garden crops are being studied to find out the optimum requirements of water.

(8) Comparative trials with water lifts, ploughs, implements and tools are going on side by side with other experiments.

Agricultural School Farm, Kalahasti, Chittoor District.

The Agricultural School Farm, Kalahasti, is situated on the Tirupati-Kalahasti road, 3 miles west away from the town of Kalahasti and 2 miles from the Kalahasti railway station. The farm was started in 1926. It is 30 acres in extent and consists of 9 acres of wet land, 5·55 acres of rainfed land and 4·80 acres of garden land while the rest is occupied by roads and buildings. The wet land gets its water from the Upper sluice of the Voorandur tank and its supply is supplemented by a single mhote well in field No. 10. The garden land area is commanded by a double mhote well in field No. 20. The average rainfall of the tract is 55 inches and about 60 per cent of it is received in the north-east monsoon period, 30 per cent in the south-west monsoon period while the rest is scattered in summer showers. The soils in general are very alkaline, with poor sand in the top soils and stiff clay in the sub-soil. This farm is intended to be attached to the agricultural school which is not yet started. The right type of education to be imparted in the school is not yet definitely settled. Besides giving a sound training in agriculture to a number of educated sons of landholders, a few secondary grade trained teachers may also be admitted and given an year's training in Agricultural subjects here to befit them to teach science in the Lower Secondary schools.

The main work on the farm at present is reclamation of the soils from alkalinity by the application of tank silt and compost in the dry area, incorporation of green-manure crops like cowpea and horsegram in the garden land area and puddling in green leaf and green-manure crops in the wet land area besides bestowing special attention to the drainage. With careful scrutiny year after year alkaline patches are being reclaimed and now the lands are brought to a stage of being capable to yield remunerative crops like sugarcane, groundnut, paddy and plantains.

WHAT AND WHEN TO SEE AT THE FARM.

January-February.—Harvest of semi-dry paddy varieties. Vadan samba, Co. 2 paddy and G.E.B. 24 also will be seen as semi-dry paddy trials. Sowing of dhaincha in the vadan samba harvested area. Transplanting and broadcasting wet paddy varieties—Kesari paddy and G.E.B. 24. Ragi and groundnut mixture, groundnut bunch variety, standing crops of sugarcane, J. 247, Co. 213 and sorghum crosses, plantains, green-manure crops of sunnhemp, cowpea and horsegram.

March-April.—Carting and spreading tank silt to the fallow fields in dry and garden lands. Ploughing with improved iron ploughs and working of Junior hoe and bund forming implements in the permanent

grasses and plantain areas. Harvest and planting of cane and preparation of jaggery. Harvest of ragi and of groundnut with H.M. Guntaka.

May-June.—Ploughing fallow fields with improved iron ploughs. Raising nursery beds and transplanting ragi and cumbu. Harvesting dhaincha from the semi-dry paddy area and composting it. Raising onion nursery and of vegetables. Manuring vadan samba area and incorporating it in soil with iron ploughs.

July-August.—Interculturing ragi with iron toothed harrow. Sowing of vadan samba, G.E.B. 24 and Co. 2 paddy with drill. Standing crop of dhaincha in the wet paddy area. Sowing redgram and arika mixture with drill and akkadi following it in 5 lines of redgram and one of arika. Sowing mixture of redgram and Budam paddy mixture in the rainfed area. Sowing of castor. Sowing of tenai and cumbu for seed and for fodder in rainfed fields. Transplanting onion seedlings.

September-October.—Harvest of ragi and cumbu and selection of plant for seed. Standing crop of vadan samba. Green-manure crops of dhaincha in wet lands. Sowing of cowpea and horsegram for green manure in the harvested dry and garden land fields. Standing crops of tenai, cumbu, G.E.B. 24, redgram and onions. Interculturing semi-dry drilled paddy with wooden toothed harrow (Pandlamanu). Sowings of Co. 2 paddy and pine apple standing crop.

November-December.—Harvest of fodder cumbu and dhaincha. Harvest of spreading variety of groundnuts with H.M. Guntaka. Puddling in of dhaincha for green-manure crop in wet paddy area. Sowing nursery beds for wet paddy varieties, Kesari and G.E.B. 24. Standing crops of sugarcane varieties and making of silage with the harvested fodder crops.

No investigation work is yet taken up in the farm as the required uniformity of standardization in the soils of the farm is not yet obtained. But a trial is being attempted to compare results of paddy in broadcast versus transplanted and drilled methods both with regard to their yields and expenditure for cultivation of the crop.

Visitors are welcome.

C. NARAYANA AYYAR,
Deputy Director of Agriculture, IV Circle.

2 (e). Fifth Circle.

This circle comprises the districts of Trichinopoly and Tanjore. It is under the charge of a Deputy Director of Agriculture with headquarters at Trichinopoly. The office is situated in the old Police Hospital buildings, Puttur. The postal address is "Deputy Director of Agriculture, V Circle, Trichinopoly."

(a) Propaganda.

2. To make the propaganda work more efficient and systematic, four centres are selected in each taluk where all the improvements suitable for the tract will be demonstrated. The Agricultural Demonstrators, instead of dissipating their attention all over the taluk will concentrate their work in these centres and thus make all the ryots adopt the improvements. When the ryots are fairly conversant with the improvements, the

agricultural demonstrators will move to other centres. The demonstrators are stationed at the following places :—

Trichinopoly District.

Taluk.	Headquarters.	Centres of Work.	Taluk without demonstrators.
1. Trichinopoly.	Trichinopoly ...	Arasangudi, Cholamadevi, Adavathur, Manigandam, Perugamani.	...
2. Lalgudi ...	Lalgudi ...	Lalgudi, Pullambadi, Alundalaipur, Samayapuram, Siruganur.	...
3. Perambalur ...	Perambalur ...	Valikondapuram, Perali, Chettikulam, Krishnapuram, Perambalur.	...
4. Udaiyarpalaiyam.	Ariyalur ...	Ariyalur, Udaiyarpalaiyam, Ambappur, Muthukulam, Kilapalur.	...
5. Musiri ...	Musiri ...	Evur, Turaiyur, Kattuputtur, Thathayyangarpet, Vairachettipalaiyam, Pulivalam.	...
6. Kulittalai ...	Kulittalai ...	Mayanur, Marudur, Manapparai, Thogamalai, Vyampatti.	...
7. Karur ...	Karur ...	Karur, Velayuthampalaiyam, Paramathi, Kakkavadi, Chinnadharapuram.	...

Tanjore District.

Taluk.	Headquarters.	Centres of Work.	Taluk without demonstrators.
1. Tanjore ...	Tanjore ...	Tanjore, Royampet, Maharajapuram, Sengipatti, Saidambalpuram.	Arantangi.
2. Papanasam ...	Papanasam ...	Nallur, Agaramangudi, Kalancheri, Alangudi, Ganapathiagraharam, Chandrasekarapuram.	...
3. Kumbakonam.	Kumbakonam ...	Odayalur, Kumbakonam, Tiruppanendal, Tirumangalakudi, Kuthanur.	...
4. Mayavaram ...	Mayavaram ...	Sembanarkovil, Therzhandur, Muvalur, Pudupalaiyam, Manamodu.	...
5. Shiyali ...	Shiyali ...	Shiyali, Edakkudivadapathi, Hanumanthapuram, Kunnam, Thiruvengadu.	...
6. Nannilam ...	Nannilam ...	Nannilam, Keeranur, Sedinipuram, Authanur, Magilancheri.	...
7. Negapatam ...	Tiruvarur ...	Tiruvarur, Iluppur, Sikkal, Valivalam.	...
8. Mannargudi ...	Mannargudi ...	Pandiyakudi, * Poovanur Karuppakkilar, Chettichatram.	...
9. Tirutturaippundi.	Tirutturaippundi.	Uppur, Kariapatnam, Nedumbalam, Alattambadi, Mettupalaiyam, Neermulai.	...
10. Pattukottai ...	Pattukkottai ...	Pattukottai, Papanad, Orattanad, Peravurni, Tambikkottai.	...

3. Main lines on which district work is being developed are—

(*a*) *Proper Ways of conserving Cattle Manure.*—All the liquid and solid droppings of farm animals form the most handy and cheap manure

available to the ryot. The ryots are advised to improve the methods adopted by them in conserving manure so that they add every sort of refuse of the farm with the urine and dung and keep it well as manure without allowing itself to be deteriorated by exposure. Any ryot who does not properly conserve manure is really losing a good portion of his own property. Therefore considerable efforts are made by the Agricultural demonstrator to educate the ryots in adopting the proper ways of conserving their cattle manure and other farm refuse for use as manure.

(*a*-1) *Introduction of Green Manure Seeds and supplying the Seeds at as cheap rate as possible.*—Dhaincha or *Thakkapundu*, kolinji or *kavalai*, sunnhemp and indigo are the four green-manure seeds that the ryots are advised to use for raising green-manure crops on their own lands. Dhaincha grows well in any soil, while kolinji, sunnhemp and indigo will grow in sandy and loamy soils only. By persistent sowing, ryots of Tanjore district have been successful in growing kolinji even in clayey soils.

(*b*) *Popularization of Concentrated and Chemical Manures suitable for the tracts.*—Analyses of the Tanjore delta soils show that they are deficient in phosphoric acid. Phosphatic manure is being advocated to the ryots for manuring their lands ; (1) Superphosphate, (2) Fish-guano, (3) Bone-meal and (4) Trichinopoly phosphate are some of these. Phosphoric acid in the two latter is insoluble and does not, therefore, become readily available to the plants. But it becomes available fairly quickly when these manures are used in conjunction with green leaves or oil-cakes. These manures can be had from the Tanjore District Co-operative Manure Society, Nidamangalam, Cadambur Bone Mills and Messrs. Parry & Co., Ranipet.

It is advisable to apply chemical manures in conjunction with organic manures, e.g., cattle manure, oil-cakes, compost, etc.

(*c*) *Introduction of Suitable Improved Implements tested and approved by the Department for Ploughing Wet and Dry Lands.*—Light iron ploughs of the Meston type are useful for wet and garden lands while medium-sized ploughs of the monsoon type are useful for dry tracts. Ryots owning small animals which cannot pull the medium-sized plough can use the light iron ploughs with advantage.

(*d*) *Propagating and Distributing Improved Strains of Paddy.*—At present strains of red sirumani, white samba, Nellore samba, kuruvai, ottadan, poombalai and also of a fine-riced variety resembling kichili samba are being distributed and are finding favour with ryots. These strains are comparatively hardy, mature uniformly and yield 10 to 15 per cent more than the corresponding local strains. The paddy strains received from the Agricultural Research Station, Aduturai, are too limited for distribution in the two districts. They are multiplied under seed-farm conditions and distributed only to mirasdars who undertake to distribute the produce from their lands to their neighbours.

(*e*) *Introduction of Better Varieties of Sugarcane, Better Methods of Cultivation and manuring and Improved Systems of preparing Jaggery.*—At present there is very little cane cultivation in the Tanjore delta and the small area that is found in Trichinopoly is grown with a poor yielding variety known as "NANAL" (Reed cane) cane. For the same expenses better varieties can be cultivated and better profits obtained. Improved varieties of canes introduced by the Department in the South Arcot district are therefore being recommended to the ryots in the circle.

Along with the distribution of improved canes, better systems of planting such as trench planting, better systems of manuring, such as application of fish-guano (if available) or cake or ammonium sulphate and bonemeal with green manure and improved methods of preparing jaggery, i.e., the use of *Sindwahe* furnace and big pans, are also brought home to the ryots.

(*f*) *Reduction of Seed-rate of Paddy.*—Considerable saving can be effected by reducing the quantity of seed sown in the nursery and transplanting the seedlings in twos and threes. The seed-rate suggested by the Department so far as Tanjore and Trichinopoly are concerned is—

(i) 10 m.m. of samba seed sown in 8 or 10 cents of seed-bed will be sufficient for an acre

(ii) 15 m.m. of kuruvai seed sown in 10 cents of seed-bed will be ample to plant an acre.

(*g*) *Improved Strains of Cambodia Cotton* are obtained every year from Coimbatore and are supplied to ryots.

Arrangements are also being made in the Trichinopoly district to gin the *kappas* of some ryots who have grown crops of departmental seed and reserve the seed for themselves and others. Ryots are also advised to plant cotton in lines in order to facilitate hoeing with bullock power.

(*h*) *Demonstration Plots.*—The advantages of improved system of cultivation are being brought home to ryots, by demonstrating them on ryots' own lands in suitable centres at their cost, but under the supervision of the departmental officers. With a view to making these demonstrations more useful and effective, co-operative agricultural societies have been formed to run them on a field scale on the lands of the members or others leased out by them. At present there are eight such societies, five in the Trichinopoly district, viz., Lalgudi, Marudur, Musiri, Nerur and Vangal and three in the Tanjore district, viz., Palliagraharam (near Tanjore), Mulangudi (near Tiruvarur) and Sedinipuram (near Nannilam). In addition to demonstrating the agricultural improvements, these societies serve as agents for the supply of improved seeds, implements and manures to their members.

The trial of "dry" and garden-land crops in wet lands has been taken up at the Agricultural Research Station, Aduturai, in order to investigate the possibilities of alternative cropping in paddy lands. The Agricultural Research Station, Aduturai, is under the control of the Deputy Director of Agriculture, V Circle.

Ryots requiring seeds, manures, improved varieties of sugarcane setts or implements should apply to the nearest demonstrator sufficiently early. As no credit sale is allowed, consignments will be sent on receipt of an advance. The balance amount will be recovered by sending the railway receipt by V.P.P.

4. At the headquarters of each of the demonstrators in charge of sub-circles, there is a depot where green-manure seeds such as kolinji, dhaincha, sunnhemp, indigo, etc., and paddy seeds will be available at proper seasons.

5. *Diseases on Plants and Trees.*—There is a Mycology Sub-Assistant posted to this circle with headquarters at Aduturai to work after the diseases on plants and trees, etc.

6. **Industries Department.**—Boring operations are being carried on in both the districts (power-boring and hand-boring) by the Industries Department. There is an Assistant Industrial Engineer with headquarters at Tanjore. He has jurisdiction over six districts, viz., South Arcot,

Tanjore, Trichinopoly, Madura, Ramnad and Tinnevelly. There are Supervisors under him. One is stationed at Tanjore with jurisdiction over the Tanjore district and the other at Trichinopoly with jurisdiction over Trichinopoly and Madura districts. Applications for boring setts, investigation of state loans for pumping setts, inspection of compounded plants, conducting blasting in the borings put down, erection of newly purchased machinery for pumping and for industrial purposes, investigating and recommending aid to cottage industries are all attended to by the supervisor. Cultivators requiring help on the above items of work may refer to the Supervisor of Industries. The address of the Assistant Industrial Engineer, Tanjore. is, "Assistant Industrial Engineer, Palace Buildings, East Main Street, Tanjore". There is no separate office for the Supervisor at Tanjore. The address of the Supervisor of Industries, Trichinopoly, is "Supervisor of Industries, Rani Mangammal's Palace, Trichinopoly."

7. **Co-operative Department.**—There is a Deputy Registrar of Co-operative Societies for Trichinopoly district with a Sub-Deputy Registrar to assist him. There is also a Deputy Registrar of Co-operative Societies for Tanjore district with a Sub-Deputy Registrar to assist him. Organization and registration of rural societies both credit and non-credit work and supervision of work done by these societies are attended to by the Deputy Registrar. The addresses of the officers are as follows:—

(i) Deputy Registrar of Co-operative Societies, Puttur, *Trichinopoly.*

(ii) Deputy Registrar of Co-operative Societies, Co-operative Buildings, West Main Street, *Tanjore.*

8. There is also a District Veterinary Officer with headquarters at Trichinopoly for these two districts.

List of Articles with Their Prices available at the Demonstrators' Depots.

Tanjore District.

Depots.	Articles available.	RS.	A.	P.	
Tanjore. Papanasam. Kumbakonam Māyavaram. Shiyali. Nannilam. Tiruvarur. Mannargudi. Tirutturaippundi. Pattukkottai.	Kolinji seed	0	1	6	per m.m.
	Dhaincha ,, ...	0	4	3	each
	Sunnhemp ,, ...	0	1	6	,,
	Indigo ,, (Cocanada) ...	0	3	0	,,
	Do. ,, (Nandyal) ...	0	3	9	,,
	Pillipesara ,, ...	0	2	0	,,
	Groundnut ,, ...	0	1	3	per lb.
	Paddy-seed strains	1	8	0	per kalam of 24 m.m. loose.
	Onion seed	2	0	0	per lb.
	Cooper plough, No. 25 — Iron parts only.	4	8	0	each
	Cooper plough, No. 25 — Spare shares ...	0	5	6	,,
	Do. No. 26 — Iron parts only.	8	12	0	,,
	Do. No. 26 — Spare share with point.	1	1	0	,,
	Do. No. 26 — Spare point alone.	0	3	6	,,
	Do. No. 11 — Plough ...	9	4	0	,,
	Do. No. 11 — Spare shares ...	0	9	0	,,

List of Articles with Their Prices available at the Demonstrators' Depots—cont.

Trichinopoly District.

Depots.	Articles available.		Price. RS.	A.	P.	
Trichinopoly. Lalgudi. Kulittalai. Karur. Musiri. Perambalur. Ariyalur.	Kolinji seed	...	0	1	6	per m.m.
	Dhaincha „	...	0	4	3	„
	Sunnhemp „	...	0	1	6	„
	Indigo „	(Cocanada) ...	0	3	0	„
	Do. „	(Nandyal) ...	0	3	9	„
	Pillipesara „	...	0	2	0	„
	Groundnut „	...	0	1	3	per lb.
	Paddy-seed strains	...	1	8	0	per kalam of 24 m.m. loose.
	Onion seed ...	... ...	2	0	0	per lb.
	Cooper plough, No. 25	Iron parts only	4	8	0	each
		Spare shares.	0	5	6	„
	Do. No. 26.	Iron parts only.	8	12	0	„
		Spare share with point.	1	1	0	„
		Spare point alone.	0	3	6	„
	Do. No. 11	Plough ...	9	4	0	„
		Spare shares ...	0	9	0	„

(b) Research.

1. *Origin and Location of the Station.*—**The Agricultural Research Station, Aduturai,** was opened in 1922, and the work previously done at the old Manganallur Farm was intensified and developed here. The station lies in Maruthuvakudi village about two furlongs to the south of the Aduturai railway station on the main line between Tanjore and Māyavaram. The area covered is approximately 50 acres of which about 45 acres are cultivable fields, the rest being taken up by buildings, roads, high-pieces, etc.

What to See and When to See.

2. *June-July.*—Preparation of dry seed-beds for sowings of "kuruvai" and "udu". Thin sown seed-beds of the first crop. Transplantation of the first crop, and preparation of "samba" wet nurseries and sowing.

August-September.—Wet nurseries of "samba," preparation of "samba" fields for transplanting, and samba seedlings being transplanted. Kuruvai varieties in flower. Remedial measures to prevent damage to crop by crabs and rats.

October-November.—Harvest of first crop varieties. Preparation of kuruvai fields after harvest. Transplanting "thaladi" or second crop.

December-January.—Best time to see the station. Samba varieties in ears. Roughing methods of making single plant selections, flower-making, etc., and examination for economic characters. Observations and estimation of disease. Harvests of early "samba" varieties.

February.—Harvesting, threshing, winnowing, cleaning, drying, storing seeds, cattle-threshing. Dhaincha, sunnhemp and kolingi as green-manure crops in early paddy fields.

March-June.—Issue of seeds to ryots. Preparation of kuruvai dry nurseries. Trials of crops like groundnut, gingelly, plantains, sugarcane and cholam, etc.

The loose-box method of stalling cattle, the proper preservation of cattle manure, and composting of waste organic material can be seen at all times of the year.

PROBLEMS UNDER INVESTIGATION.

3. (*a*) The evolution and ultimate release of improved and high-yielding strains of paddy, which could profitably replace ryots' local inferior and impure varieties.

(*b*) The comparative merits of organic and inorganic manures used severally and jointly in various proportions, as a manure for paddy. The relative manurial values of loose-box manure and organic compost as fertilizers for paddy.

(*c*) The trial cultivation of dry and garden-land crops wherever possible, so that larger profits could be readily obtained and overproduction of paddy and consequent market depression avoided.

Visitors are welcome.

N. S. KULANDAISWAMI PILLAI,
Deputy Director of Agriculture, V Circle.

2 (f). Sixth Circle.

1. The Sixth Circle comprises Madura, Ramnad and Tinnevelly districts and it is in charge of a Deputy Director of Agriculture, with headquarters at Madura. He is assisted by two Assistant Directors of Agriculture stationed at Madura and Tinnevelly. The offices of the Deputy Director of Agriculture and the Assistant Director of Agriculture, Madura, are located in one of the buildings of the Government Industrial Institute on the Madura-Pasumalai road.

The office of the Assistant Director of Agriculture, Tinnevelly, is located in one of the Government buildings at Kokkirakulam, a mile to the east of the Tinnevelly junction station.

The Assistant Director of Agriculture, Madura, is in charge of the Madura district and the six eastern taluks of the Ramnad district. The Assistant Director of Agriculture, Tinnevelly, is in charge of the whole of Tinnevelly district and the three taluks of Srivilliputtur, Sattur and Aruppukottai of the Ramnad district. In each taluk is stationed an Agricultural Demonstrator, for conducting demonstrations and looking after the district work.

(a) Propaganda.

2. The headquarters and jurisdiction of the Agricultural Demonstrators in the Sixth Circle are as shown below:—

Table showing Taluks with Agricultural Demonstrators.

District.	Taluk.	Headquarters.	Centres of demonstrators.
Madura ...	... Palni ...	... Palni ...	... Palni, Chatrapatti, Kiranur and Idaykottai.
	Dindigul	... Dindigul	... Dindigul, Eriodu, Vedasendur and Palakkanuthu.

Table showing Taluks with Agricultural Demonstrators—*cont.*

District.	Taluk.	Headquarters.	Centres of demonstrators.
Madura—*cont.* ...	Nilakkottai ...	Nilakkottai ...	Alanganallur, Nilakkottai and Batlagundu.
	Melur ...	Melur	Melur, Kattayampatti, Nattam, Kottampatti and Ambalakaranpatti.
	Madura	Madura	Madura, Narasingam Kallandiri, Samayanallur, Kunnattur and Sholavandan.
	Periyakulam ...	Periyakulam ...	Periyakulam, Uttamapalaiyam, Ganguvarpatti, Bodinayakkanur and Andipatti.
	Tirumangalam ...	Tirumangalam ...	Tirumangalam, Kalligudi, D. Kallupatti, Usilampatti and Sekkanurani.
Ramnad	Sivaganga ...	Sivaganga ...	Manamadura, Sivaganga, Tiruppuvanam and Partibanur
	Tiruppattur ...	Tiruppattur ...	Singampunari, Pattamangalam, Thekkur and Kunnakudi.
	Sattur	Sattur	Kothur Meesalur, Othagal and Metamalai.
	Srivilliputtur ...	Srivilliputtur ...	Watrap, Rajapalaiyam, Nallamanaikkanpatti and Nachiarkoil.
	Aruppukottai ...	Aruppukottai ...	Chidambarapuram, Mallampatti Ramasethupuram, Sevalpatti.
Tinnevelly ...	Tinnevelly ...	Tinnevelly ...	Gangaikondan Manur, Melakallur, and Rajavallipuram.
	Srivaikuntam ...	Srivaikuntam ...	Vasavapapuram, Pudukkottai Perungulam, and Aryapernallur.
	Nanguneri ...	Nanguneri ...	Moondradappu, Tirukurungudi Kalakkad and Moolakkarupatti.
	Tiruchendur ...	Tiruchendur ...	Alwartirunagari, Thentiruperi, Angamangalam and Ammanpuram.
	Ambasamudram...	Ambasamudram.	Kadayam, Alwarkurichi, Melacheval and Veeravanallur.
	Tenkasi ...	Tenkasi ...	Kadayanallur, Pambuli, Melpavur and Sivaramapettai.
	Sankarankovil ...	Sankarankovil ...	Vasudevanallur, Puliangudi, Kalligulam and Kalingapatti.
	Kovilpatti ...	Kovilpatti ...	Vilattikulam, Ottanatham, Kayathar and Nalattinputhur.

Taluks without Demonstrators.

District.	Taluks.
Ramnad	Paramakudi.
	Ramnad.
	Mudukulattūr.
	Tiruvadanai.

3. Propaganda and demonstration are the chief works of the Agricultural Demonstrators who concentrate their attention in the centres of each

taluk shown above. A depot is maintained by each demonstrator wherein improved implements and selected seeds are stocked for supplying to the ryots at cost price. They also indirectly help the villagers to keep their village surroundings and streets in a sanitary condition. The following are the important items of propaganda and demonstration :—

(1) *Collection and Proper Preservation of Farmyard Manure.*—The ryots are advised to prevent the waste of urine, which is an important constituent of cattle manure, by using earth and litter in cattle sheds to serve both the purposes of bedding for the animals and absorbing the urine. The manure thus collected will have to be preserved in shallow pits covered by a layer of earth. Composting of all the available organic matter, such as weeds and grasses, cane trash and megass, to supplement the cattle manure, is also advocated.

(2) Clean cultivation both before and after a crop is sown by using iron ploughs and guntakas.

(3) Levelling and bunding of plots to allow rain water to soak into the soil.

(4) *Cattle Breeding.*—The ryots are induced to improve their cattle by maintaining good breeding bulls and also by better feeding with oil-cakes and specially grown grasses and fodder crops by preparing hay and ensilage. There are thirty-one breeding bulls in this circle. These are available to the public on payment of a fee of As. 8 per service.

A statement showing where the bulls are stationed and the breed of the bull is given below :—

Madura Division.

Place.		Breed of the bull.
Gnanamuthu, Sathangudi Post, Tirumangalam.	65	Kangayam.
R. Venkataswami, Sengapadai, Tirumangalam.	61	do.
Rev. Dudley, Tirumangalam	72	do.
Robert of Udayampatti	89	do.
Chinnaswami of Perungamanallur ...	91	do.
Palaniyandi Tevan, Kokkulam	77	do.
Palni Goundar, Kanchanaickenpatti, Palni taluk.	82	do.
Christian Vedamony of Vagaikulam ...	98	do.
Minakshi Nayakar of Ponnamangalam ...	107	do.
Muhammad Yusuf Ambalam, Abiramam, Manamadura.	99	do.
Rev. Brother Michael, Kodaikanal		Half-bred bull..
Velur V. Samy Naicker, Chatrapatti ...	112	Kangayam.
Lorbeer of Pasumalai	15	Scindhe.
Nallathambi Servai, Nallathambipatti, Tiruppattur taluk.	50	Kangayam.
Rev. Stanley Vaughan, Manamadura ...	3	Scindhe.
President, District Board, Madura, Usilampatti.	87	Kangayam.
	100	do.
President, District Board, Ramnad (Muttanendal).	105	do.
Rev. C. E. Wolsted, Manamadura ...	14	Last Hope (Buffalo).
Rev. Dudley, Tirumangalam	15	Hopeful (Buffalo).

Madura Division—cont..

Place.		Breed of the bull.
Municipal Council, Dindigul	114	Kangayam.
Zamindar of Devakotta, Kalaiyarkoil ...	51	do.
Rev. Rigly, Shenbaganur	156	Cross-bred.

Veterinary Hospitals.

Madura	12	Scindhe.

Tinnevelly Division.

Idaiseval in Kovilpatti taluk		Kangayam.
Kilapavur in Tenkasi taluk		Do.
Melaseval in Ambasamudram taluk ...		Nellore.
Ilanji, Tenkasi taluk	123	Kangayam.
Ottanatham, Koilpatti taluk.		
Anavarathanallur, Srivaikuntam taluk.		
Rajapalaiyam, Srivilliputtur taluk.		

Poultry.—Necessary advice and help are rendered to start and develop good breeds of laying hens as a side line to agriculture.

(5) *Demonstration Plots.*—Plots of cultural, varietal and manurial demonstrations are arranged in ryots' lands to show the advantages and superiority of the improvements advocated by the Department. Neighbouring ryots are taken to such plots and methods adopted are explained to them. The improved implements are actually worked in each ryot's lands for his conviction before he is asked to purchase one.

(6) *Exhibition and Lectures.*—In important centres exhibitions are held on the occasions of festivals and cattle fairs. Lectures are also delivered with magic lantern on the importance of improved methods of agriculture and practical demonstrations with ploughs and other improved implements are conducted whenever conditions permit.

(7) *Agricultural Improvement Associations.*—One such Association has been started at Velur in Palni taluk. The functions of the Association at present are to grow improved strains of Cambodia and Karunganni for multiplying and distributing seed in the whole village and its neighbourhood, the use of improved implements and preservation of cattle manure in pits by each member and to effect joint sale and purchase.

Another one is working at Srivaikuntam in the taluk of the same name. The members are all land-owners. The Association is growing improved paddy strains under seed farm conditions. Demonstration plots to popularize the various improvements recommended by the Department are run at the expense of the Association.

Attempts are being made for the formation of such Agricultural Associations in some more selected centres.

(8) *Seed Distributions.*—Pure seeds of improved strains of paddy and cotton, like G.E.B. 24 and A.E.B. 65, Karunganni C. 7 and A. 10 and Cambodia Co. 2, are grown on ryots' lands under seed farm conditions for multiplication. The seeds thus obtained are stocked in departmental depots and distributed to ryots.

Paddy.—Improvements on paddy are being carried out under the following lines :—

(*a*) Growing of green-manure crops and judicious use of bonemeal and artificial manures in combination with green manure.

(*b*) Raising of thin seed-beds to get healthy seedlings and to prevent waste of seed.

(*c*) Use of small iron ploughs to obtain better tilth with fewer number of ploughings.

Cotton improvement—(*a*) Sowing in lines to facilitate after cultivation by working labour-saving implements.

(*b*) Clean picking of kapas and its joint sale through a co-operative society.

(9) *Control of Insect and Fungus Diseases.*—Besides the demonstrators who do propaganda work in each taluk, there is another demonstrator with headquarters at Kovilpatti Agricultural Research Station with jurisdiction over Madura, Ramnad and Tinnevelly districts who helps the ryots in combating diseases of crops. He will attend only to important calls as his jurisdiction is extensive.

At each Taluk headquarters where an Agricultural Demonstrator is stationed an Agricultural depot is opened and improved implements and seeds are stocked for distribution.

4. List of articles stocked in the depots of the Agricultural Demonstrators in the circle :—

	RS.	A.	P.		
(*a*) *Implements*—					
Cooper plough, No. 25 ...	4	8	0	each.	Prices will go down still if purchases are made in large lots.
Do. No. 11 ...	7	0	0	,,	
Do. No. 26 ...	8	12	0	,,	
Digging forks	4	0	0	to 5 0 0 each.	
Shares for Cooper, No. 25.	0	5	9	each.	
Do. No. 11.	0	9	0	,,	
Do. No. 26.	1	1	0	,,	with point.
H. M. Guntaka, No. 0 ...	3	12	0	,,	Prices approximate. Can be supplied to order.
No. 1 ...	6	8	0	,,	
No. 2 ...	12	4	0	,,	
Mhote wheels	11	0	0	,,	

(*b*) *Seeds*—

Kolinji. Daincha. Indigo. Sunnhemp. Paddy. Groundnut. Cotton—Cambodia— Karunganni. Perimanjalcholam.	Prices vary each season and can be ascertained from the nearest Demonstrator.

N.B.—The prices quoted above are subject to fluctuation according to the prevailing market rate.

5. *Miscellaneous.*—Distribution of improved varieties of groundnut sugarcane and Bellary onion and construction of improved furnace for jaggery-making.

6. **Co-operative Department.**—There are two Deputy Registrars of Co-operative Societies in the circle. One is in charge of Madura and Ramnad districts except Sattur and Srivilliputtur taluks of the Ramnad district with headquarters at Madura and the other in charge of Tinnevelly district and Sattur, Srivilliputtur taluks of Ramnad district with headquarters at Tinnevelly. There is also a separate Sub-Deputy Registrar for Sattur and Srivilliputtur taluks with headquarters at Srivilliputtur. Those who require information on matters relating to Co-operative Societies may apply to these officers.

7. **Department of Industries.**—The Assistant Industrial Engineer of Tanjore, who is also in charge of Madura, Ramnad and Tinnevelly districts, will supply on application all information connected with pumping installations and boring of wells.

(b) Research.

The Agricultural Research Station, Kovilpatti.

1. This station was opened early in 1901. It is located near the Kovilpatti railway station and it consists of two separate blocks of land. The red soil block is about half a mile from the railway station and contains the farm buildings, office and stores and quarters for the staff. The area of this block is 25 acres but 16 acres alone is under cultivation, the rest being occupied by buildings, roads and yard. There are four wells commanding 12 acres of the block. A ginnery is attached to the farm where pure cottons grown on the farm and under seed farm conditions are ginned and seeds distributed to the ryot population. Breeding bulls are maintained here. They are open to the public for service on a small fee.

The black soil block is about 2 miles from the railway station along the Sattur Road. The extent of this block is 115 acres but the actual cultivated area is 105 acres, the rest being occupied by roads, yards and buildings. The soil is representative of the tract in which the farm is located.

Problems under Investigation.

2. (*a*) Attempts are made to evolve better strains of cotton to replace the improved Karunganni strains of C. 7 and A. 10, which are under general cultivation at present.

(*b*) Manurial trials are being conducted to find out the requirements of cotton by the application of organic or inorganic manures separately and in combination and also in a single dose or in more than one dose.

(*c*) Trials are made to determine the kind of preparatory cultivation needed for the crops on the black soil.

(*d*) The causes for the depressing effects of fodder cholam on the following cotton are being investigated with a view to find out some remedy.

(*e*) Trials of various crops both indigenous and exotic, are made with a view to introduce new varieties suitable to the tract.

What to See and When to See.

3. *October.*—Sowing of cotton, cumbu and cholam in drills.

November, December and January.—Intercultivation of cotton and cumbu with Dantulu by bullock power. Standing crops and selections of

cotton, cumbu and cholam and the experiments conducted on these and also study of selections. Silage preparation with cholam and other fodders.

February to July.—Harvesting of cereals and picking of cotton. Ploughing with improved ploughs.

August and September.—Preparing fields for next sowing; proper way of manuring fields, working of the ridge plough for making ridges and furrows on which to plant cambodia cotton.

At all times.—Clean cultivation of land; management of loose box to gather the best cattle manure; proper preservation of cattle manure; Buffaloes and bulls at stud; proper feeding of cattle; improved ploughs and drilling implements; White Leg-horn birds; guinea grass; sprayers and the control of insects and diseases and Persian wheel water lift.

K. UNNI KRISHNA MENON,
Deputy Director of Agriculture.

2 (g). Seventh Circle.

This circle consists of the two West Coast districts, Malabar and South Kanara, and the work of the Department is under the control of a Deputy Director with headquarters at Tellicherry, North Malabar.

(a) Propaganda.

2. There are nine taluks in Malabar and six in South Kanara and each of these taluks has a demonstrator to demonstrate agricultural improvements in the taluk. Each taluk has been divided into four divisions with a central village in each division to carry on intensive work in these centres. After achieving sufficient progress in these central villages and their surroundings, further centres will be selected. Demonstrators visit these centres periodically once a month and remain there for four or five days and carry on the propaganda work. Ryots are requested to visit these central villages and see the progress of work and consult the demonstrators in matters connected with the agricultural improvements. If desired by ryots, demonstrators will visit their land and give free advice. The list below shows the headquarters of each demonstrator, his jurisdiction, and the central villages where intensive work is being carried out.

South Kanara District.

Taluk.	Headquarters.	Centres of demonstration.
Coondapoor ...	Coondapoor ...	(1) Coondapoor.
		(2) Baindur.
		(3) Basrur.
		(4) Thekkette.
Udipi	Udipi	(1) Udipi.
		(2) Mulur.
		(3) Anjar.
		(4) Arur.
Karkal	Mudabidri	(1) Karkal.
		(2) Karimanel.
		(3) Mudabidri.
		(4) Kallamudkur.

South Kanara District—*cont.*

Taluk.	Headquarters.	Centres of demonstration.
Puttur ...	... Puttur ...	... (1) Puttur.
		(2) Beltangadi.
		(3) Sullia.
		(4) Vittal.
Mangalore ...	Mangalore ...	... (1) Bangrakulur (Mangalore).
		(2) Iddya.
		(3) Ambalamoguru.
		(4) Bajpe.
Kasaragod ...	Kasaragod ...	... (1) Kunjattur.
		(2) Kanhangad.
		(3) Trikaripur.
		(4) Kasaragod.

Malabar District.

Chirakkal ...	Cannanore ...	... (1) Edakkad.
		(2) Kokkanasseri.
		(3) Anjarakandi.
		(4) Taliparamba.
Kottayam ...	Tellicherry ...	... (1) Eranjoly (Tellicherry).
		(2) Kudali.
		(3) Kuttuparamba.
		(4) Panniyannur.
Wynaad ...	... Manantoddy	.... (1) Manantoddy.
		(2) Kaniyampetta.
		(3) Kalpetta.
		(4) Sultan's Battery.
Kurumbranad ...	Badagara ...	... (1) Nadapuram.
		(2) Badagara.
		(3) Payyoli.
		(4) Pantalayini.
Calicut ...	... Calicut ...	... (1) Cheruvannur.
		(2) Karannur.
		(3) Nanminda.
		(4) Kotulli (headquarter limit).
Ernad ...	... Manjeri ...	... (1) Manjeri.
		(2) Nilambur.
		(3) Kondotti.
		(4) Vallikunnu.
Ponnani ...	... Ponnani ...	... (1) Tanur.
		(2) Ponnani.
		(3) Chowghat.
		(4) Kumaranallur.
Walluvanad ...	Perintalmanna	... (1) Perintalmanna.
		(2) Pattambi.
		(3) Mannarghat.
		(4) Ottapalam.
Palghat ...	... Palghat ...	... (1) Palghat.
		(2) Elapulli.
		(3) Peruvemba.
		(4) Pallavur.

Demonstrators visit the centres of work and advise ryots to adopt improvements, such as, importance of sowing pure seed, proper feeding of cattle, utilization of organic waste, proper preservation of farmyard manure, and methods to be adopted in controlling insect and fungus pests. In addition to this, specific items of work on paddy, sugarcane, coconut and pepper cultivation are being carried out according to localities by starting trial and demonstration plots.

Seed Distribution.—The importance of sowing pure seed is constantly brought to the notice of the ryots and assistance is rendered in supplying pure seed of improved strains of paddy from research stations. During the past year 140 tons of paddy seeds were distributed to ryots in this circle. As it is not possible to meet the total demand, ryots are taught to keep their seed pure.

The cultivation of coconut is extending in the circle and ryots are supplied with seednuts from selected high bearing trees at the Research Station, Kasaragod. Coconut seedlings raised from nuts collected from selected gardens in Malabar and South Kanara are raised at the Research Station at Nileshwar and are supplied to the ryots.

The demand from ryots for cuttings of good varieties of pepper is met. Ryots are being advised to cultivate fruit plants. Suckers, mostly of pineapple and plantains, and grafts of mango and sapota are supplied to cultivators. Best attention is paid to the supply of seeds to ryots whenever a demand comes and proper guidance is given in the cultivation of all crops.

Demonstration of Ensilage.—On the hill slopes and pasture grounds large quantities of green grass are available after the rains. This grass dries up in the hot weather and becomes waste. The method of utilizing such hill grass by preparing silage is demonstrated.

Compost.—To meet the increased demand for bulky organic manure, the preparation of compost from all available organic waste such as dried leaves, green leaves, stubbles of crops, weeds, etc., is demonstrated.

Proper Preservation of Farmyard Manure.—Farmyard manure is the cheapest and the best, but the most neglected one. A good deal of waste occurs in the method of collection and preservation and these defects are constantly brought to the notice of the ryots. Loose-box system of collecting cattle manure prevents such a waste to a large extent. The ryots are being advised to construct proper cattle sheds and use green and dry leaves, waste fodder and stubbles of crops as litter and thereby improve the quality and quantity of manure. This system of collecting cattle manure is in vogue in South Kanara district and the ryots in Malabar are taught to adopt this system.

Care of Cattle.—Propaganda work on proper feeding, breeding and housing of cattle is being carried out. Ryots are advised to feed their cattle with oil-cakes and other concentrated foods. The importance of growing fodder crops such as cholam, guinea grass, elephant grass, are constantly brought to their notice and slips of these grasses are supplied to them.

Co-operative societies and rich ryots are encouraged to maintain breeding bulls. There are nine breeding bulls and three breeding buffalo bulls in this circle. In addition to this, the Department is maintaining two breeding bulls, at the Veterinary Hospital, Mangalore and one at the Veterinary Hospital, Cannanore, and one breeding buffalo bull at the Agricultural Research Station, Taliparamba. By paying a small fee these breeding bulls are available for the use of the ryots.

The question of proper housing of cattle is important in this circle as heavy rainfall is experienced for more than six months. This fact is brought to the notice of the ryots and they are encouraged to construct proper cattle sheds.

Control of Insect-Pests.—The two serious pests that receive attention are *spodoptera* on paddy and *Nephantis serinopa* on coconut. Wherever these pests appear prompt measures are being taken to control them and educate the cultivators on their life-history and the preventive methods to be adopted. The control methods consist in (1) cutting and burning the infested leaves, (2) breeding and liberating parasites on the pest.

Fungus Diseases.—As the circle is subjected to heavy rainfall, *mahali* disease on arecanut, bud-rot disease on palmyra and coconut very often appear. The spraying of arecanut with bordeaux mixture against *mahali* disease has been very effective and prompt measures are taken whenever the disease appears. Against the bud-rot disease of palmyra and coconut, the cut and burn method of the affected trees which are a source of contamination is preached and the Pest Act against this disease is in force in Palghat taluk. Whenever reports on the appearance of insect pest and fungus diseases on different crops are received, prompt steps are taken to inspect the locality and adopt control measures.

Demonstration and Trial Plots.—The results of research work conducted in the Research Stations are first tested in the cultivator's land in trial plots. If the results are encouraging the improvement is spread by arranging demonstration plots in different centres. So the results of research work reach the ryots.

Exhibitions and Lectures.—Every year an exhibition on a big scale is held in each district. In addition to this, small shows are held in each taluk in the circle. These shows are generally held during important local festivals or co-operative conferences or at the time of jamabandi. In these shows improved implements, seeds, manures, posters representing different insect and fungus diseases and their control methods and charts showing the results of research work are exhibited. Practical demonstrations of the working of the improved implements and methods of combating insect and fungus diseases are held. Further, lantern lectures on various agricultural improvements are also delivered.

Specific Items of Work.—Improvements in the cultivation of paddy, coconut, pepper and sugarcane, the four important crops in this circle, are suggested to ryots and all facilities in the matter of supply of seed, advice on planting, manuring, and after-cultivation are given.

Ryots who require assistance of the Department should write to the demonstrators of the respective taluks or to the Deputy Director of Agriculture, VII Circle, Tellicherry.

At the headquarters of each demonstrator there is a depot and a small show room. In these depots, seeds and implements suited to the locality are stocked. In the show rooms samples of seeds and manures, posters, charts and agricultural literature such as leaflets, bulletins, Villagers' Calendars, are kept. Seeds and other requisites of the ryots are met from these depots. Prices of different seeds and other particulars can be had by visiting these depots or on application to the demonstrator.

Co-operative Department.—There are two Deputy Registrars of Co-operative Societies, one for Malabar and the other for South Kanara. The headquarters of the Deputy Registrar for Malabar is at Calicut and that of South Kanara is at Mangalore. They help the ryots in organizing

co-operative societies which lend money on a low rate of interest for carrying out agricultural improvements. Ryots desirous of starting co-operative societies should apply to them.

Industries Department.—The Assistant Industrial Engineer who looks after industrial work in these two districts has his headquarters at Coimbatore. Ryots requiring assistance in installing oil-engines, boring, pumping and other matters connected with machinery should apply to this officer.

(b) Research.

The Agricultural Research Station, Pattambi.

Inception.—The Agricultural Research Station, Pattambi, was started in 1927.

Situation.—The above Research Station is located within a mile from the Pattambi Railway station in the Netrimangalam and Kotalur desoms of the Walluvanad taluk, just where the Pulamantole and Palghat roads converge. The area of the station is 82 acres, comprising "Iruppugal" or double crop wet land, "palliyal" or single crop wet land, "modan" or hill paddy area, and "thodis" or house-site compounds.

What to See and When to See.

April.—Ploughing double crop wet land with iron plough sowing cow-gram for green manure with the advent of vishu showers—drying of seed stock—germination tests of seeds and despatch of seed to agricultural demonstrators for distribution to ryots.

May.—Samai and modan sowings in dry lands—sowing of both dry and wet nurseries for first crop paddy—standing fodder crop of cholam, cumbu, sunnhemp and green manure crop of cow-gram—preparing land and planting ginger—sowing ragi, groundnut, cotton, dhaincha, sunnhemp and soy-bean in modan land. Standing crop of different varieties of sugarcane.

June.—Harvest of fodder and green manure crops—ploughing in green manure and puddling for first crop planting—transplantation of first crop paddy—standing crops of modan paddy, samai, ragi, cotton, groundnut, sunnhemp, dhaincha and soy-bean.

July.—Finishing up transplantation of first crop paddy—mature samai crop ready for sickle, modan in shot blade, groundnut, dhaincha and sunnhemp in flower—growing crops of sugarcane—remedial measures against crab damage to freshly planted first crop paddy—hand catching and trapping.

August.—Ploughing after samai harvest and sowing horsegram for green manure—modan crops in ears—first crop paddy well established and in full growth—preparation of nurseries for second crop and sowing deep water or karinkura varieties—standing crops of cotton and groundnut, in full flowers.

September.—Paddy crops in "Iruppugal" and "Palliyal" areas in flowers—harvest of modan paddy—ploughing in modan stubble and sowing gingelly. Sowing of second crop nurseries—insect control by bagging or netting—light traps for checking paddy stem-borer moths—weeding and mulching ginger with leaf—harvest of groundnut—planting of "karinkura" varieties of paddy.

November.—Finishing up second crop transplantation—gingelly and horsegram in pods—ploughing in "in situ" horsegram as green manure in modan land. Ensiling hill grass "Ischaemum ciliare" in pits, to store reserve forage for cattle.

December.—Second crop paddy in flower—roguing in seed blocks—harvest of gingelly—well-grown standing crops of sugarcane.

January.—Second crop paddy nearing harvest—sugarcane nearing maturity—preparation for milling sugarcane and boiling cane-juice—erection of Sindewahe furnace.

February.—Harvest of second crop paddy varieties. Preparation of fields for and sowing of fodder cholam, cumbu and sunnhemp—harvest of ginger crop—ploughing nursery areas of first crop paddy—harvesting sugarcane, milling, boiling cane-juice and jaggery making—planting sugar-cane setts.

March.—Completing harvest of late second crop varieties—standing crops of cholam, cumbu and sunnhemp in place of "punja" paddy—composting weeds and waste materials in pits using water suspension of cattle dung and sprinkling of bonemeal—silage pits opened and silo fed to cattle.

Note.—The manure pits, orchard and pineapple plantation and livestock including a dairy herd of she-buffaloes can be seen at all times of the year.

Different Problems under Investigation.

The main work of the station is the improvement of the paddy crops of the two West Coast districts of Malabar and South Kanara by the well-known methods of isolation of high yielding strains of plants from existing varieties of paddy and the synthesis of new strains by hybridization of individuals possessing valuable economic characters. Selections from a large number of important first, second and third crop varieties of the two districts are in various stages of yield-tests. Some promising strains have also been pushed on to tests in ryots' land in selected centres of the district. Both swamp and dry paddy varieties are receiving attention on this station.

Other Problems under Investigation.

Trials of crops other than paddy in rotation with it or in substitution of it wherever practicable are well under way. Crops like samai, horsegram and gingelly are taken in rotation with paddy in "modan" or dry lands. Groundnut, cotton, cholam, cumbu, dhaincha and sunnhemp are under trial in modan as well as palliyal land. Sugarcane is also tried in rotation with transplanted paddy in palliyal land. Trial of dhaincha and sunnhemp in substitution of paddy as third or punja crop in wet lands, is also under investigation.

An orchard containing various kinds of fruit trees is being established in dry land area to test the suitability of these fruit trees here. Pineapple cultivation in modan land promises to be lucrative.

Preparation of silage with all kinds of grasses and manufacture of organic compost with weeds and vegetable refuse of all kinds form regular routine practices of the station. Farmyard manure is preserved on most up-to-date lines.

The working animals of the station are an example of what proper housing and systematic feeding can do to raise the value of the otherwise poor cattle of this tract.

Visitors are quite welcome to the station and will be most willingly shown round by the staff.

The Agricultural Research Station, Taliparamba.

1. The Research Station was started in the year 1905 with the main object of studying the pepper cultivation in all its aspects. This is situated nearly ten miles away from Taliparamba Road railway station on the side of the road from Taliparamba to Irikkur. The distance from Taliparamba town to the station is two miles. Buses and motor cars will be generally found at the railway station ready to take passengers to Taliparamba town, from where besides a bus service to Irikkur side once a day, motor cars are always available on hire to the Farm.

The Research Station is over 148 acres in extent of which 57 acres are under cultivation.

	ACRES.
Pepper	29·60
Wet lands	8·59
Dry lands	16·86
Orchard	2·00
Total ...	57·05

The Agricultural Middle School is not working now.

WHAT TO SEE AND WHEN TO SEE.

April.—Iron plough at work in wet land, guntakas in coconnt gardens and crop of Kew and mauritius pineapples in full bearing, etc.

May-June.—(1) Pepper planting, (2) thin nursery of paddy, (3) ploughing in of green manure crops and puddling wet land, (4) transplanting of paddy, (5) final manuring of sugarcanes, (6) sowing and planting of dry land area.

July-August.—Digging of pepper plots. Filling up gaps in pepper plots, manuring of coconuts and fruit trees.

August-September.—The best time to visit the station will be August-September, when almost all the crops will be in the field. A visitor can see (*a*) in the wet lands—(1) the transplanted paddy crop on improved lines grown from selected seed and compare it with the neighbour's crops, (2) different varieties of sugarcane, (3) Nendrum plantains and several varieties of local bananas, (*b*) in garden area—(1) pepper vines of different varieties and proper maintenance of pepper gardens, (2) interplanted coffee in pepper gardens, (3) orchard where an attempt is made to grow various fruit trees, and (*c*) in the dry lands—(1) systematic and intensive cultivation of profitable crops like chillies, ginger, turmeric, tapioca, pineapples, etc., instead of hill paddy, (2) fruit trees like graft mango and sapota, (3) coconut cultivated under dry system, (4) fodder crops like cholam, cumbu and bulrush millet.

October-November.—Preparation of silage and hay-making. Second digging in pepper plots. Fairly full grown crops of different varieties of sugarcane.

December-January.—(1) Fruit garden with bearing trees, (2) pulse crops in wet lands, (3) pepper harvest, tying vines and mulching the crop, (4) preparation of land for planting sugarcane, (5) nendrum plantains and vegetables in wet land, (6) commencement of sugarcane milling and jaggery making.

February-March.—(1) Milling of canes and preparation of jaggery, (2) planting of sugarcane, (3) nendrum plantains and summer vegetables in wet lands, (4) green manure crops, (5) silage being fed to cattle.

Bee-keeping can be seen and instructions about it can be had at all times. A few good buffaloes with a breeding buffalo bull of Delhi breed are now kept to demonstrate the necessity of improving the local breeds. Proper preservation of cattle manure and organic compost can be seen throughout the year.

The chief items of investigations are—(1) The effect of season on the shedding of pepper, (2) study of the varieties of pepper to suit different conditions, (3) standards for pepper and regulation of shade in the pepper plots, (4) cultivation and methods of propagation of pepper, (6) study of "pollu" disease and trial of preventive measures, (7) trial of coffee as subsidiary crop in pepper area.

Wet Lands.—(1) Introduction of green manuring for paddy by raising green manure crops like cowgram, etc., (2) improvement of paddy by bulk selection of seed and better cultivation, etc., (3) study of different varieties of plantains.

Dry Lands.—(1) Regular rotation of crops, (2) cultivation of rainfed crops like cotton, ginger, chillies and pineapple, (3) study of fruit trees, especially graft mango.

Besides, demonstration of general interest such as preparation of silage from hill grass for feeding cattle in dry season, making compost from all organic waste material and proper collection and preservation of cattle manure are carried on at the station.

The West Coast Coconut Stations.

There are four Agricultural Research Stations comprising this group. They represent three different types of soil available for coconut cultivation.

Nileshwar No. I Station (Pilicode).—This station, started in 1916, is situated in Pilicode village of Kasaragod taluk of South Kanara. The nearest railway station is Cheruvattur on Madras-Mangalore line. The Agricultural Research Station is about 1½ miles to the south of Cheruvattur railway station.

The soil is of laterite origin containing a high proportion of gravel. The area is fairly flat, the laterite rock cropping to the surface in some of the plots. The total area of the station is 70 acres of which 33·68 acres are already planted.

WHAT TO SEE AND WHEN TO SEE.

This station being mainly devoted to the cultivation of coconut under the dry system, all the operations connected with it can be seen here.

January-February-March and April.—The main field operation during these months is working of the shovel cultivator or Guntaka to create soil mulch.

May-June.—Working of Monsoon plough, cowgram green manure crop, the application of different chemical manures in the experimental plots and the spraying of the coconut trees against fungus disease can be seen.

July-August.—Cowgram green manure crop will be fully grown by this time, and will be ploughed in along with the application of cattle manure in the non-experimental plots. Spraying of coconut trees against shoot-rot will be continued. Green leaves will be collected from the waste lands outside the station, chopped and put in cattle shed as litter.

October-November and December.—Ploughing with Monsoon plough, and working shovel cultivator or Guntaka will be continued in the coconut plots. Towards the end of November grass in area not planted will be cut and made into silage. Treatment of trees affected by shoot-rot can also be seen.

PROBLEMS UNDER INVESTIGATION.

Coconut trees have been planted at different depths from the surface 1 foot, 2 feet and 3 feet, and at different distances from one another and the results are being watched. Coconut varieties from different coconut growing centres in the world have been planted and the characters are being studied. To see which month's harvest is the best for taking seed nuts, the nuts collected from a particular tree in the Agricultural Research Station, Kasaragod, in each month are being planted and their characters studied. Seedlings from selfed nuts obtained from selected trees at Kåsaragod station have been planted. These will be compared with the seedlings from the nuts obtained of the same set of trees by natural fertilization.

Nileshwar No. II Station.—This station is about 5 miles to the north of No. I Station (Pilicode) and a mile to the west of Nileshwar railway station. Though a cart road connects the railway station and the farm, public conveyances are not available.

This station was opened in 1916 along with other coconut stations, but the first planting was done in May 1918. The soil is red sandy loam.

WHAT TO SEE.

The seedlings raised from crossed, selfed and naturally pollinated nuts have been planted.

PROBLEMS UNDER INVESTIGATION.

This station along with Nos. I and III stations was started to conduct experiments on an elaborate scale on the lines indicated by the results of the experiments at Kasaragod. The results of planting at 1 foot deep and on the surface are being studied in portions of two other blocks. The area is reserved for experiments to be laid out hereafter when all the trees come into bearing.

Nileshwar No. III Station.—This station is situated about a mile to the north-west of Nileshwar Station No. II. A kacha road connects the two stations except for a small ferry between. Boats are always available for crossing the ferry. The Nileshwar river flows by the side of this station and the sea is about three-fourths of a mile away.

The soil is littoral sand with water table at about 18 feet below ground level in the hottest part of the year April-May.

The total extent of the station is 48·07 acres of which 26 acres have been planted.

WHAT TO SEE AND WHEN TO SEE.

January-February-March and April.—There will not be much to see in this station during these months, except collecting of coconut leaves and preparing organic compost for manure. Seed nuts will be put in the nursery in April-May.

May-June.—The fields will be ploughed with Monsoon plough and cowgram green manure crop sown with the first rains.

July-August.—Cleaning of the crowns of coconut trees is the main operation during this period.

August-September.—Ploughing in of green manure crop of cowgram and application of manures.

October-November and December.—(1) Ploughing the plots with Monsoon plough, (2) working of shovel cultivators or H.M. Guntaka.

All the coconut trees are under the dry system of cultivation. The varieties of coconut trees of different coconut growing centres of the world can also be seen in one of the plots. Seedlings from coconuts obtained by crossing done at Kasaragod station were planted in a portion of the area. Methods of raising coconut seedlings can also be studied.

PROBLEMS UNDER INVESTIGATION.

(1) This station also is intended to start manurial experiments on the lines indicated by the results of the experiments at Kasaragod. (2) The characters of the coconut seedlings from nuts obtained by crossing as well as by selfing are being studied and compared. (3) To study the best age of mother trees, seedlings from nuts got from the trees of different ages have been planted.

Agricultural Research Station, Kasaragod.—This station is situated in Koodlu village of Kasaragod taluk of South Kanara. It is 3 miles to the north of Kasaragod railway station. Taxi cars and jatkas are available at Kasaragod town. The sea is only about 3 furlongs from the Farm.

The soil is red sandy loam almost similar to the soil at Nileshwar No. II station. The total area of the station is 30·90 acres of which 25·90 acres have been planted.

In 1916, the Government acquired this existing garden and the trees were then about 20 to 25 years old.

WHAT TO SEE AND WHEN TO SEE.

The main crop of the station is coconut. Subsidiary crops like fodder cholam, fodder maize, ragi, groundnut, are grown in the non-experimental plots.

January-February-March and April.—(1) Working of the shovel cultivator or guntaka for creating soil mulch in coconut plots, (2) making of copra, (3) composting coconut leaves for manure, (4) working of the buck-scraper to level the area not planted.

May-June.—(1) Application of manures in the experimental plots, (2) ploughing and sowing green manure crops of cowgram in the

non-experimental plots, (3) sowing of subsidiary crops, such as fodder cholam, groundnut, etc.

July-August.—There is not much work during this period except cleaning the crowns of the coconut trees.

October-November and December.—Ploughing will be continued in October-November and shovel cultivator or H.M. Guntaka will be worked to create soil mulch and remove weeds.

Problems under investigations.—(1) The general characters of coconut trees are being studied. (2) A series of experiments are being carried out to study the manurial requirements and to test the effect of different manures on coconut trees. These experiments are only preliminary and more detailed experiments are to be started at Nileshwar staitons. (3) The effect of intercultivation and non-cultivation on coconut trees are being studied. (4) The possibility of converting the dry leaves of coconut into manures is under investigation. (5) Crossing and selfing of coconut. (6) Effect of cultivation of subsidiary crops under coconut trees.

Visitors are welcome.

K. T. ALWA,
Deputy Director of Agriculture,
VII Circle, Tellicherry.

List of Articles available at the Demonstrators' Depots.

	RS.	A.	P.	
Paddy seeds—				
Tavalakannan	0	0	6	per lb.
Rajakayama				
White-riced kayama				
Modan				
Karuthamodan				
Taliparamba paddy seed				
GEB. 24	0	0	8	,,
Co. 3				
Paramban Navara...	0	0	6	,,
Green manure seeds—				
Kolinji	0	0	8	per lb.
Seed coconuts	3	0	0	per 100 delivery at Kasaragod coconut station.
Beetle hooks	0	1	0	each.
Villagers' Calendars in English, Malayalam and Kanarese.	0	1	0	,,
Bulletin No. 98.—Pepper cultivation on the West Coast in English, Kanarese and Malayalam.	0	2	0	,,
Abridged Report of the Royal Commission on Agriculture in Malayalam and Kanarese.	1	8	0	each.
Cooper plough No. 25	4	8	0	,,
Spare share alone for above ...	0	5	6	,,
Spare bolt and nut for above ...	0	2	3	each set.
Pineapple suckers...	Rs. 2 to 4 per 100.			

2 (h). Eighth Circle.

The Eighth Circle comprises the whole of Coimbatore, Salem and the Nilgiris districts and is in charge of a Deputy Director of Agriculture, whose headquarters are at the Agricultural College, Lawley Road P.O., Coimbatore. He is assisted by a Temporary Assistant Director of Agriculture at headquarters with another Assistant Director of Agriculture at Salem for Salem district. Agricultural Demonstrators are now stationed at practically all taluk headquarters and ryots when requiring advice on agricultural problems or supply of seeds, etc., should apply in the first instance to the nearest agricultural demonstrator. A list showing the jurisdiction and headquarters of the demonstrators is given under each district.

Taluk.	Headquarters.	Centres of work.	Taluk without demonstrators.
		Coimbatore District.	
1. Erode ...	Erode	Erode, Unjalur, Perundurai, Arachalur.	......
2. Bhavani ...	Bhavani	Bhavani, Andiyur, Ayyampalayam.	......
3. Gobichetti-palaiyam.	Gobichetti-palaiyam.	Gobichettipalayam, Mevani, Kodiveri.	......
4. Dharapuram	Dharapuram ...	Dalavoipatnam, Kulattupalayam, Palaiyakottai.	......
5. Udamalpet ...	Udamalpet ...	Udamalpet.	
6. Pollachi ...	Pollachi	Pollachi, Kallipatti, Kottur-malayandipatnam.	......
7. Coimbatore...	Coimbatore ...	Coimbatore Idigarai, Alandurai.	......
8. Kollegal ...	Kollegal	Kollegal, Kamakarai, Palaiyam.	......
9. Palladam ...	Palladam	Sulur, Karadibavi and Palladam.	......
10. Palladam ...	Tiruppur... ...	Perumanallur.	
11. Avanashi ...	Annur	Annur, Sellappampalaiyam.	......
		Salem District.	
1. Salem ...	Salem	Salem, Mallur, Virapandi.	......
2. Attur ...	Attur	Attur, Ethapur, Tidavur.	......
3. Namakkal ...	Rasipuram ...	Rasipuram, Thoppampatti.	......
4. Namakkal ...	Namakkal ...	Mohanur, Namakkal, Velur, Kalappanayakanpatti.	......
5. Tiruchengode.	Tiruchengode ...	Tiruchengode, Mallasamudram, Edapadi.	......
6. Omalur ...	Omalur	Omalur, Mecheri, Taramangalam.	......
7. Dharmapuri.	Dharmapuri ...	Dharmapuri, Indur, Papparapatti.	......
8. Krishnagiri ...	Krishnagiri ...	Krishnagiri, Kaveripatnam, Bargur and Kannandahalli.	......
9. Hosur ...	Hosur	Hosur, Sulagiri, Denkanikota.	......
10. Harur ...	.....	......	Harur.

Taluk.	Headquarters.	Centres of work.	Taluk without demonstrators.
	The Nilgiris District.		
1. Ootacamund.	Ootacamund ...	......	......
2. Coonoor and Kotagiri.	Coonoor. ...	......	......

The main lines of work in progress are as follows:—

(1) Formation and registration of Agricultural Improvement Associations at selected demonstration centres in each taluk. These associations are intended to assist the Agricultural Department in its propaganda and demonstration work, assist in seed multiplication and distribution of improved strains and wherever possible maintain a good breeding bull for improvement of the local livestock. Items of propaganda and demonstration include such fundamental practices as (i) collection and preservation of farmyard manure in pits and manufacture of compost to supplement the small quantity of farmyard manure generally available by composting prickly-pear and all organic waste material available on the average holding.

(2) Better and cleaner cultivation by using improved ploughs, guntakas and seed drills.

(3) Preservation of soil moisture by proper cultivation and levelling and forming bunds to hold the rainfall until it has had a chance to soak into the soil ; and mulching to prevent excess evaporation.

(4) Drilling cereal and dry cotton crops to permit of subsequent intercultivation. Dibbling irrigated Cambodia cotton in lines to conserve seed, give a uniform spacing and permit of furrow irrigation.

(5) Improvement of livestock by maintaining good breeding bulls and inducing ryots to feed concentrates to their cattle.

(6) Trials and demonstrations of improved varieties of seed and balanced manuring.

(7) Better preservation of food materials, e.g., silage making.

(8) Irrigation scheme for dry crops under Lower Bhavani project investigation.

(9) Co. 2 Cambodia cotton seed extension scheme.

(a) Propaganda.

Coimbatore District.

The district is in charge of the Deputy Director of Agriculture, VIII Circle, Coimbatore. The office is located near the Agricultural College, Lawley Road P.O., Coimbatore. Ryots who wish for advice should either apply to the Deputy Director or to the nearest Agricultural Demonstrator. There are demonstrators in all the taluks of the district. Each demonstrator has a permanent depot for sale of seeds, implements, etc. A list of articles in these depots with their prices is appended.

The agricultural practices of this district can be divided into three classes, viz., (1) wet cultivation, mainly under channel irrigation along the banks of the big rivers such as the Bhavani, the Cauvery and the Amarāvati, (2) intensive farming on garden lands under well irrigation, and (3) dry land farming, a precarious type due to uncertain rainfall especially on light soils.

District work was commenced in improving the paddy cultivation by better methods of cultivation and by better manuring. The seed rate for paddy was much too heavy, the seedlings in the nursery were very crowded

and pale in colour and naturally did not establish themselves quickly when transplanted. As a result of demonstration work, conditions have greatly altered. Seed beds are better manured. Seed is not sown thickly and the seedlings are planted out 2–3 instead of 6–9 in a hole. As a result of propaganda, a general reduction of seed rate has been brought about and of late this improvement has come to be so largely adopted that it is found impossible to keep correct account of the acreage. The question of manuring also has received attention.

As the district work of the Department has become known to the ryots in the district, it has been found possible to co-operate with the latter in making trials of new varieties of paddy and ragi, and manures like poonac, bonemeal, ammonium sulphate and superphosphate.

Trials of new varieties of paddy which have been produced at the Paddy Breeding Station, Coimbatore, are in this way being tested in different parts of this district to see how they suit local conditions. During 1933–34, 22,354 lb. of seed of improved strains of paddy were distributed. And it is now found almost impossible to keep trace of the natural spread of these strains.

In the case of garden land cultivation, the most pressing need is manure. When one considers the expense of cultivation and especially of irrigation, which is the same whether the crop is good or bad, the value of manure which will insure a heavy yield will be realized. Every possible means must therefore be taken to ensure a good supply of cattle manure by composting all waste material such as litter, prickly-pear, plantain refuse, etc., and by judicious use of suitable artificial manures.

Considerable success has been achieved in the introduction of green manure crops, which are grown to be ploughed in. Their value lies not so much in supplying plant-food as in improving the physical condition of the soil and in improving the drainage, which often is not good. This is specially the case where the well water is inclined to be saline and dhaincha has been found to be particularly well suited in such circumstances. It is becoming increasingly difficult to cope with the large demand for green manure seeds in the district. 13,589 lb. of green manure seeds of dhaincha, sunnhemp, kolinji, indigo, blackgram and greengram were distributed last year.

The use of gorru for sowing dry crops in regular lines and intercultivating such crops with bullock power is being demonstrated.

Of crops grown on garden lands, little has yet been done as the varieties grown are very local and systems of rotation vary very much within limited areas. The one exception, however, is Cambodia cotton. This was first introduced into the district in 1906 and at the present time the district produces from 75,000 to 100,000 bales of this cotton. The problems which are being dealt with are the supply of better seed and the protection of the crops from the attack of insect pests and diseases.

Special attention is bestowed on this important crop in this district. The main lines of improvement are—

(1) Growing improved strains of cotton under seed farm conditions and distributing through seed depots, seed societies and co-operative agencies.

(2) Improving methods of cultivation by line sowing and intercultivation.

(3) Trials of manures.

(4) Trials of sowing early in the season as well as late.

(5) Enforcing the Pest Act in respect of Cambodia and *Pachanadan*

Last season 326,977 lb. of departmental Cambodia cotton seeds were distributed to ryots of this district. The entire area of Cambodia cotton seed farms in this district was cropped with Co. 2 strain. The total area of these seed farms is 954 acres.

Seed Societies.—The multiplication of seed of No. 2 strain of Cambodia cotton is undertaken by ryots under agreement with the department. The seed farm ryots have now been grouped into seed societies, which are now registered as non-credit societies under the Indian Co-operative Act with suitably amended by-laws. The total number of such seed societies is four.

The following seed societies belonging to the Tirupur centre during 1933–34 grew 954 acres under Co. 2 cotton under the supervision of the Agricultural Department :—

Village.	Members.	Area.
Tiruppur Centre—		ACS.
1. Perumanallur	76	535
2. Muttiankinar	53	273
3. Periyapalaiyam	19	146
	148	954

With the help of funds from the Indian Central Cotton Committee and staff from the Agricultural Department, the Tirupur Co-operative Trading society has agreed to work a seed multiplication scheme for increasing the amount of pure Co. 2 Cambodia seed available for sale distribution. During the present year, nearly 4,122 acres of seed farms were under control.

So great had been the damage done 15 years back by insect pests and so great was the danger of these pests entirely spoiling the Cambodia cotton crop in the future, that for the last 14 years all Cambodia crops are being removed under the "Agricultural Pests and Diseases Act" (III of 1919), after the "Paruvam" and "Kar" pickings are over. *This is being done in order to keep down the number of insects before the next crop is sown and it has already been found that this has done much to improve the quality of Cambodia cotton in the district.*

Karunganni Cotton.—Last year 101,321½ lb. of improved Karunganni cotton seed was distributed to ryots. 809·87 acres of seed farms were also grown by eighteen ryots in Udamalpet taluk.

Improvement of Livestock.—Improvement of livestock is receiving special attention in this district. There are 15 breeding bulls in this district on the premium scheme in addition to a number of other bulls owned by private breeders. Ryots are also given facilities for interesting themselves in improvement of poultry, pigs and sheep.

Veterinary Department.—The Veterinary Department officers of whom there are nine stationary and five touring officers co-operate in castrating young bulls which are not suitable for breeding purposes.

Co-operative Department.—The Deputy Registrar of Co-operative Societies has his headquarters at Coimbatore and he has jurisdiction over the districts of Coimbatore and Nilgiris. There is also a Sub-Deputy Registrar for the two districts.

Department of Industries.—The Assistant Industrial Engineer has his headquarters at Coimbatore with jurisdiction over Salem, Coimbatore, the

Nilgiris, Malabar, South Kanara, North Arcot, Chittoor, Cuddapah and Anantapur districts.

APPENDIX.

Available Articles at the Agricultural Demonstrator's Depot with Approximate Prices.

Name of article.	Approximate price.
1. *Green Manure Seeds*—	
Kolingi	8 pies per pound.
Daincha	1 anna per pound.
Sunnhemp	9 pies per pound.
Indigo	2 annas per pound.
2. *Cotton Seeds*—	
Cambodia (Co. 2)	Price not yet fixed.
Karunganni (C. 7)	Do.
3. *Paddy Seeds*—	
GEB. 24	24 lb. per rupee.
Co. 1	
Co. 2	
Co. 3	
Co. 4	
Co. 5	
Co. 6	
Co. 7	
Adt. 5	
AEB. 65	
4. *Ragi*—	
EC. 47	About 5 pies per pound.
EC. 593	
5. *Cholam*—	
AS. 60	About 5 pies per pound.
AS. 1543	
AS. 1575	
AS. 809	

6. *Implements*—

The Agricultural Demonstrators in the respective places stock the following implements for sale to ryots :—

	RS.	A.	P.
Cooper plough No. 11 (new model) ...	7	0	0
Spare share alone	0	8	6
Cooper plough No. 25	4	8	0
Spare share alone	0	5	9
Cooper plough No. 26, single handle ...	8	12	0
Spare share with point	1	2	3
Spare share, point alone	0	3	6
H.M. Guntaka No. O	4	8	0
Spare blades, 6″ straight	1	8	0
H.M. Guntaka No. 1	8	0	0
Spare blades, 15″, curved	2	12	0
H.M. Guntaka No. 2	14	4	0
Spare blades, 24″, curved	3	14	0

They will also help to get the spare parts for ploughs previously obtained by the ryots and other ploughs recommended by the Agricultural Department.

Salem District.

This district is now under the charge of the Assistant Director of Agriculture, Salem near Salem Town Railway Station. The list of demonstrators in the district has already been shown.

Enquiries on any agricultural matters should be addressed to the Assistant Director of Agriculture at the above address or the nearest Demonstrator may be consulted.

The propaganda work carried on by the demonstrators is on the following lines :—

(*a*) Giving advice on the proper preservation of cattle manure; composting of all waste organic matter for increasing the manure supply and demonstrating the same.

(*b*) Giving advice regarding proper feeding of cattle; recommending the keeping of breeding bulls by public bodies or rich mirasidars on premium system. Demonstrating, silage making.

(*c*) Giving timely advice regarding the method of control of insect and fungoid pests and demonstration of spraying and other control methods.

(*d*) Arranging for exhibition and lantern lectures at the time of the more important cattle fairs, co-operative conferences, etc., to popularize the activities of the Department.

(*e*) *Seed Distribution.*—Opening sub-depots or influencing co-operative societies to stock and sell seeds and implements recommended by the Department and giving proper advice regarding soils and seasons best suited for, and the best method of growing these seeds.

(*f*) Opening demonstration plots to demonstrate the superiority of the departmental seeds such as Co. 2, Cambodia cotton seed; and various strains of paddy, cholam and groundnut. Drilling as against broadcasting of cumbu; line sowing of Cambodia cotton; and the advantages of supplementing the ryot's stock of organic manure by the addition of artificials in sufficient doses.

(*g*) Assisting in getting supplies of improved varieties of canes such as J. 247 and Fiji B. and giving necessary advice regarding their planting; intercultivation; manuring and finally demonstrating improved methods of jaggery making.

Agricultural improvements. Extending the use of iron ploughs by a more extended use of the Takkavi loans.

(*h*) Trial and demonstration of thick and thin cane varieties evolved in the Imperial Sugarcane Breeding Station at Coimbatore and selection of varieties most suitable to Salem district.

(*i*) Advising ryots to grow green manure crops on paddy lands and thus save time and money in getting green leaves from the forests or waste lands.

(*j*) Assisting in getting supplies of improved varieties of potatoes and giving necessary advice regarding their planting, intercultivation, disinfection from wilt and

(*k*) Encouraging ryots to form themselves into organized units in each village or group of villages called "Agricultural Associations" to be run on co-operative lines for carrying out improvements in agriculture on the lines indicated above.

List of Depots in this District.

Taluk.	Where situated.
Salem	Within the Collectorate compound.
Attur	Opposite to the Travellers Bungalow.
Rasipur	Next to District Board High School.
Namakkal	Within the Taluk office compound.
Tiruchengode	Opposite to Travellers' Bungalow.
Omalur	Bazaar street.
Dharmapuri	The main bazaar street.
Krishnagiri	Railway station road.
Hosur	Livestock Research Station, Hosur.

Seeds, etc.—List of articles available at the above depots—

Paddy seeds.—GEB. 24, Co. 1, Co. 2, Co. 3, Co. 6, Co. 7, Adt. 3 and Adt. 4.

Articles	
Tella Jonna, Teosinte E.C. 593 ragi, A.H. Groundnut seed, Periamanjal cholam seeds.	Prices which vary from season to season can be ascertained on enquiry at any depot.
Cambodia and Karunganni cotton seeds ...	
Bellary onion seeds	
Copper sulphate packets and Fungi Sulphur packets.	
Kolingi, daincha, indigo, sunnhemp seeds for green manure.	

Implements.—The Agricultural Demonstrators stock in their respective depots the following implements for sale to ryots:—These prices are subject to alterations:

	RS.	A.	P.
Cooper plough No. 11 (new model) ...	7	0	0
Spare share alone	0	8	6
Cooper plough No. 25	4	8	0
Spare share alone	0	5	9
Cooper plough No. 26 single handle ...	8	12	0
Spare share with point	1	2	3
Spare share, point alone	0	3	6
H.M. Guntaka No. O	4	8	0
Spare blades, 6" straight	1	8	0
H.M. Guntaka No. 1	8	0	0
Spare blades, 15" curved	2	12	0
H.M. Guntaka No. 2	14	4	0
Spare blades, 24" curved	3	14	0

Spare parts for the implements are also available and arrangements will also be made to get supplies of other implements such as roll-easy mhote wheels; chaff-cutters, drills, buckscrapers, junior hoes, etc., through firms dealing in these or through their agents in Salem district, if necessary.

Co-operative and Industrial Departments.—There is a separate Deputy Registrar of Co-operative Societies for Salem with headquarters at Salem town to whom enquiries regarding that department should be addressed.

The headquarters of the Assistant Industrial Engineer in charge of this district is in Coimbatore. Enquiries regarding well-boring, erection of pumping plants, etc., should be addressed to him.

The Nilgiris District.

The Nilgiris district work is under the direct charge of the Deputy Director of Agriculture, VIII Circle. At present there are two demonstrators in the district—their headquarters and jurisdiction being as follows :—

	Address.	Jurisdiction.
Agricultural Demonstrator ...	Government Gardens, Ootacamund.	Ootacamund taluk.
Do. ...	Sim's Park, Coonoor.	Coonoor and Kotagiri taluks.

These demonstrators are engaged principally in arranging supplies of seed potatoes of the best varieties through seed farms, but advice will be given on all agricultural questions, which are addressed to them including pruning and manuring of all crops and fruit trees, tea and coffee; spraying against pests and diseases has also been successfully demonstrated.

(b) Research.

There is a large experimental station attached to the Agricultural College, called the "Central Farm." There are also a "Paddy Breeding Station," a "Millet Breeding Station," "Sugarcane Breeding Station" and a "Cotton Breeding Station" in the same locality which are in charge of the Paddy Specialist, the Millet Specialist, the Sugarcane Expert and the Cotton Specialist, respectively. The stations are situated about three miles to the west of Coimbatore. At these places efforts are being made (1) to produce better quality and disease-resisting new strains of plants, (2) to conduct experiments on improved methods of agriculture, and (3) to improve the breeds of live-stock.

Visitors are welcome.

Central Farm, Coimbatore.

The Central Farm is about 400 acres in extent and includes a variety of soils—black soil, red soil, loamy soil—dry land, garden land and wet lands irrigated from a tank fed by a channel from the Noyal river.

The Farm thus exhibits a variety of conditions. Crops of one kind or another can at all times of the year be seen on the ground and ample facilities exist for the training of students and the team work of specialists.

1. In the farmyard are seen different methods of stalling cattle and of conserving manure.

2. There is an implement museum which shows a collection of agricultural implements representative of district agricultural tracts of this Province.

3. There are on view a chaff-cutter, a cotton gin, a thresher, a winnower, an oil-cake crusher and other agricultural machinery.

4. Baling water from wells with the help of mhotes and pumping with the help of oil-engines and motors are different methods employed on this Farm to compare efficiency of water lifts. One pumping plant supplies the college estate consisting of 1,200 souls with water which is stored in a specially constructed overhead masonry tank to the south of the Research Institute.

5. Important crops to be seen on the Farm are sorghum (cholam), ragi, cotton, plantains, sugarcane, paddy, fodder crops and green manure crops. Several varieties of each of these crops are grown every year. Fruit culture and vegetable culture have established themselves.

Nature of Propaganda Work done.

Seed distribution.—Improved strains of selected crops are multiplied and distributed to ryots.

Paddy.--GEB. 24, Co. 1, Co. 3, Co. 2, Co. 6, Co. 7.

Ragi.—EC. 47.

Canes.—J. 247.

Cotton.—Cambodia cotton seed, Uppam seed, Karunganni seed.

Miscellaneous Seeds.

Green manure seeds like sunnhemp, pillipesara, are sold.

A number of plantain varieties from several districts have been planted this year for comparative study and multiplication of profitable varieties.

The profitableness of growing vegetables and fruits has been demonstrated especially with reference to cauliflowers, cabbages, tomatoes and figs.

6. There is a fine herd of cross-bred animals—cows, studbulls and calves—with an up-to-date dairy where milk is manipulated and students practise butter-making and acquaint themselves with other processes on hygienic and up-to-date lines. There is a small poultry section in addition.

7. A veterinary hospital is attached for instructional purposes, where both Government cows and bullocks and private cattle are also treated.

8. The cultivation of permanent pasture grasses is a special feature. Guinea grass and lucerne are grown all through the year, while cholam and maize are raised at regular intervals for the supply of green fodder to milch cows.

9. Preparation of green feed in the form of silage is an important item. All surplus green fodder and edible green materials are so converted.

10. Conversion of common waste material into organic manure is a normal procedure on the Farm.

11. The cheaper and more sanitary process of conversion of waste products from human beings into useful material which is known as the Activated Sludge system is at work on the estate. This is expected to replace the old system of preparation of nightsoil into poudrette.

12. A few other items of interest are—

(*a*) *Ploughing and Preparation of Land.*—Use and adjustment of tractor, mould board ploughs of different types and bed former—January to August.

Useful sets of implements known as "H.M. Guntakas," "Junior Hoe," "Double Mould Board Plough," "Sampson's Harrow," "Disc Harrow," "Cambridge Roller" may be seen at work in different seasons.

The work of ploughing in a green manure crop like sunnhemp with a reversible single disc plough or Victory plough in particular seasons is interesting.

(*b*) *Drilling.*—Use of the seed drill and the inter-cultivating implements—July to September, November.

(*c*) *Planting Paddy.*—Methods of preparing nurseries both under the dry and wet systems and sowing thin seed-bed. Economic planting—June to August.

(*d*) *Green Manure Crops.*—Cultivation and ploughing in. February to June—Wet lands. May to August—Garden land.

(*e*) *Milling of canes.*—Construction of Sindewahi furnace and the preparation of superior quality of jaggery—February—April.

Crop Calendar.

Garden Land—

March second half to July first half—Chitrai cholam.
June first half to September second half—Ragi.
November second half to February second half—Wheat.
August second half to October first half—to February first half—Tobacco.
June second half to July second half—to February second half—Chillies.
September first half to May second half—Cambodia cotton.
April to June, June to August, September to November, November to January, February to April—Cholam for fodder.

Dry Land—

July 15th to February 28th—Red gram.
July to October—Cumbu.
August 1st to December 31st—Periyamanjal cholam.
October 1st to May 30th—Dry cottons (Karunganni and Uppam).
November 15th to February 28th—Bengal gram.

Wet Lands—

June 15th to July 31st, July 31st to January 31st—Paddy.
February 15th to March 31st of next year—Sugarcane.
July 15th to March 31st—Turmeric.
May 1st to July 31st—Sunnhemp—Green manure.
April 15th to July 31st—Daincha.

Millet Breeding Station, Coimbatore.

The Millet Breeding Station is at work on the food crops of the poor of this Presidency. The important millets are cholam, cumbu, ragi and tenai. The bulk of the crop is dry, only a part being irrigated. The station is best visited in November or December, when most of the dry crops occupying the bulk of the area will be in flower or nearing harvest. In March and in September irrigated ragi crops can be seen. In June irrigated cholam occupies the field. On every one of the occasions in which a visit is contemplated, ryots can see the varieties of the crops under cultivation, all the variations observable in them, the methods of comparing valuable varieties one against the other, the pursuit of knowledge about the build of the millet grown, and the inheritance of the various single characters making up the complex called crop.

In certain seasons, they could notice a study being made of the methods by which the flowers open, the order of their opening, the way to emasculate (remove the male elements of) the flowers, and cross desirable varieties with each other to get the best results. Indoors, within the field laboratories, they can have an insight into the elaborate methods of recording observations, collating data, and such other laborious bits of work which have necessarily to precede any real advance in knowledge.

They will get to realize the thoroughness with which all these crops are being studied with a view to know all about them, so that armed with this knowledge, attempts to improve them can be made with a decent chance of success.

Cotton Breeding Station, Coimbatore.

This is situated immediately to the north of the Central Farm. It was started in 1922 with the object of investigating all problems, genetical as well as agronomic, relating to cotton.

It is now 87 acres in extent and is made up of 30 acres of black soil and 57 acres of red soil, including an area of 22 acres commanded by a well.

WHAT TO SEE AND WHEN TO SEE.

Visitors will be able to see all the year round proper methods of preserving cattle manure and of keeping weeds under control.

They may see in May and June pulling and composting of cotton stalks, the ploughing of green manure crops and working blade harrows to remove the weeds that sprout after the summer rains.

In August, the lands intended for Cambodia cotton will be split into ridges and furrows. Inside the field laboratories they will observe the methods used for the determinations of lint length and ginning percentages of small samples of cotton.

In September Cambodia cotton seeds are dibbled with the aid of irrigation in garden lands. On the outbreak of north-east monsoon in October, cotton will be drilled on the dry lands.

In November, December and January, intercultivation of cotton crops will be done. Morphological characters will be examined to study the purity of the various cultures grown. The flower tips will be smeared with clay to prevent the entry of insects carrying foreign pollen. The method of selection of plants also may be seen at this period.

In February, March and April, picking of the kappas will be done. A visitor will see the minute precautions observed to maintain the purity of the seeds and to determine accurately the yields of several selections. The cholam stubbles will also be deep ploughed during this period.

The following problems are being studied at present :—

1. Isolation of good-yielding plants by selection.
2. Improving the existing types by crossing.
3. Comparing the performance of individual plants and pure strains with the local cottons.
4. Mode of inheritance of lint and seed weights and of disease resistance.
5. The effect of previous cropping on the succeeding cotton crop.
6. Determination of measures to control the damage done by the cotton stem weevil.
7. Selection of good-yielding strains in red and bengal grams.
8. Effect of different frequencies of irrigation on yield.

Paddy Breeding Station, Coimbatore.

The paddy breeding station was started in 1915. It is situated to the south-west of the Central Farm wet land block in the revenue village of Vedapatti in the Coimbatore taluk.

The station is best reached through Sugarcane Breeding Station and along the road by the side of the Narasampatti tank bund.

The station was first opened in 1915 and with the extensions in 1919 and 1930 comprise an area of 35·33 acres.

What to See and When to See.

June-July.—General cultivation. Ploughing with Avery's Hindustan plough. Puddling in green manures. Preparation of seed beds and general sowings. Dry and wet nurseries of bulks, beds for comparative trials, single plant selections and pure lines. Raising of cross seeds in pans.

July-August.—Transplanting. Laying out comparative trials, manurial trials and special cultural trials.

September-October.—Variations in the vegetative characters and habits of growth of more than 500 pure lines collected from all over the province. Single plant selections in blocks. Flowering of early and mid-duration varieties, progenies of crosses and other early selections. Study of inheritance of characters in rice.

November.—The best time to see the station. All the principal varieties of paddy in flower. Emasculation and hybridization. Character study in full swing. Examination of vegetative characters like presence and absence of pigment in various parts of the plant, and economic characters like tillering, plant height, duration, nature of panicle—its length, size and shape of grain, and its disposition on the panicle, estimation of floret sterility, in families specially selected for such studies from the progenies of crosses. Harvest of early varieties.

December-January.—Character studies continued in the later varieties. Observations on lodging of straw. Harvests of bulks and single plant selection. Harvesting, threshing, winnowing, drying and weighing of produce from experimental plots.

February.—Drying, cleaning and despatch of seeds to circle officers and to applicants.

March-May.—Summer cropping in small areas adjacent to wells. Fodder crops like cholam, maize, sunflower, etc., and green manure crops like daincha and sunnhemp.

Different Problems under Investigations.

1. Isolation of strains from local varieties and from varieties belonging to tracts not met by the sub-stations.

2. Building up new strains having several desirable economic characters by hybridization.

3. Maintaining a collection of pure lines of local and morphological interest which serve as suitable material for hybridization work.

4. Irrigation experiments to find the duty of water for paddy.

5. Investigation into the causes of lodging in paddy—early, medium and late varieties.

6. Study of the fundamentals, inheritance of characters in the rice plant both morphological and economic and determining the nature of association between the two.

7. Trials with the latest methods of conducting yield test.

8. *Cultural and Manurial Experiments.*—The study of the different cultural and manurial practices, as broadcasting versus transplanting, age and condition of seedlings during transplantation, seed bed manuring versus plot manuring, different spacings, and the time of application of ammonium sulphate.

Livestock Research Station, Hosur.

This farm which is situated in Mathigiri village, three miles south of Hosur, in the Hosur taluk of the Salem district, was taken over by the Madras Government on the 1st September 1924 as a Cattle Breeding Farm. It had previously been in the occupation of the Army Remount Depot for 96 years.

Description.—The soils vary in texture from a rich and retentive loam to poor, hard and red gravel. The total acreage of the estate is 1,659·91 acres.

Sixty-five acres are irrigable from tanks, of which there are three; these are purely rainfed. This land is a rich black and red clay loam and is commonly called the Lucerne Garden. It comprises 35 fields in which lucerne is grown in rotation along with Rhodes grass, cholam, etc. Masonry irrigation channels convey the water to the fields from the largest tank.

The large area of pasture land is divided up into 46 paddocks, and it is beautifully laid out with roads running in different directions with avenues of trees, such as sheesum, vagai, mango, tamarind, casuarina, etc. The farm is fenced in with good aloe fence and several paddocks are enclosed with a good thorny hedge. There are about 3,000 sandalwood trees and saplings on the estate and hundreds of seedlings are growing up.

The lie of the land is generally from south to north with wide undulations. The maximum difference in the levels between any two points within the farm is 80 feet, the highest level being 3,005 feet and the lowest 2,925 feet above sea-level. The farm thus presents an appearance of a large English park.

The main object of this station is to raise better cattle and supply the ryots with good bulls for the improvement of their stock. In the case of crossbreds, however, some milch cows are available for sale. Occasionally, animals not required for stud purposes, are sold for purposes of draught. There is a small dairy on the farm, but it is not run on a commercial basis. This being, at present mainly a breeding station, most of the milk is fed to calves and surplus milk is both sold fresh and converted into butter, ghee to meet local demand.

Kangayam.—This is the best draught cattle in the south of the Presidency. The animal is compact and a bit short on the legs and is capable of doing well on a small farm. Kangayams are poor milkers, but there are some cows which give good milk yield. The station is attempting to raise milk strain without impairing the draught qualities of the breed.

Scindhe.—The Scindhe from Karachi is recognized as the best dairy breed in India. The Scindhe is compact and short and seems to do well throughout the Presidency, but the main object of this station is to produce high milk yielders and distribute bulls in the West Coast.

Ongole.—This is the biggest breed of the Presidency and its home is in the Circars. The breed is recognized as the best dual purpose (for milk and draught) animal in the Presidency.

Crossbreds.—Crossbred herds are built by crossing the Ayrshire with the native cattle preferably the Scindhes and Saniwals. There are two breeds on the station known as the Bangalore and the Coimbatore herds. The Bangalore herd is mainly for experimental purpose while Coimbatore herd supplies cows in milk to Coimbatore, where there is a dairy at the Agricultural College.

Sheep—Bellary.—As the name suggests the flock is from Bellary. The object of the experiment is to produce sheep with white wool and better mutton. Experiments are so far encouraging. Rams, which are of a high standard, are available for breeding purposes.

Rams of Bellary Wooly Sheep.—A few rams of the above woolly variety of sheep are available for sale at the Hosur Livestock Research Station. These rams are from a selected white (black-faced) flock.

The average wool yield of the flock is about 2 lb. 12 oz. per annum and rams yield anything from 4 lb. to 7 lb. wool per annum. The average weight of a good well grown ram white (black-faced) is about 120 lb. live-weight.

Prices of yearling rams range between Rs. 10 and Rs. 15 each.

Further particulars may be obtained from the Superintendent, Livestock Research Station, Hosur Cattle Farm P.O.

Poultry.—There are three breeds, White Leghorns, Rhode Island Reds, and Light Sussex maintained on this station. Trap nesting is done so as to note the utility of individual birds. From the point of view of egg production the White Leghorns are the best. The Rhode Island Reds are good dual purpose birds, while the Light Sussex are mainly table birds. Hatching and rearing of chicks are done artificially. Eggs and birds are sold to the public at moderate prices.

Price List of Eggs and Poultry.—Imported birds of the following breed are kept :—

1. White Leghorns.
2. Rhode Island Reds.
3. Light Sussex.
4. Black Minorcas.

Indigenous Breed : Chittagong.

Eggs, chickens and birds are sold at the rates quoted below :—

Eggs for setting, per dozen ...	Rs. 2.	Ten annas extra for each dozen for packing and delivery throughout the Madras Presidency.
Do. each ...	As. 3.	
Eggs for table, each ...	A. 1.	
Chicks, one day old, each ...	As. 4.	
Do. week old, each ...	As. 8.	
Do. month old. each ...	Re. 1.	
Cocks, three months old, each.	Rs. 1–8.	
Pullets, each	Rs. 2.	
Cockerels, 6 to 8 months old, each.	Rs. 3 to Rs. 6 according to breed, quality and size.	
Pullets, six months old, each.	Rs. 4 to Rs. 5 according to breed, quality and size.	

Note.—(1) Charges for poultry baskets and for delivery at the nearest railway station will depend upon the number of birds ordered or the distance to be travelled.

(2) No order will be complied with unless accompanied by an advance to cover the cost of eggs or birds and also the cost of baskets and railway charges.

Please apply to: The Superintendent, Livestock Research Station, Hosur Cattle Farm P.O.

Pigs.—There is a good breed of Berkshire pigs. They are bred for utilizing dairy and vegetable garden waste products and for supplying breeding stock to the public. Good boars for crossing and pigs for killing can be had.

Arable Land and Pasture.—There are extensive grazing lands but arable farming is necessary to supplement grazing. Guinea grass, Rhodes grass, and fodder crops such as maize, cholam and lucerne are grown throughout the year. Large quantities of fodder crops are cut and made into silage, i.e., conservation of fodder in pits in the ground, and utilized whenever there is shortage of grazing.

People are always welcome to visit the farm and every facility will be given for learning methods of breeding and raising fodder crops as adopted on this station.

1. **The Agricultural Research Station, Nanjanad,** was established in 1917. It is situated half a mile from Nanjanad village and 10½ miles from Ootacamund along the Governor's Shola Road. The area of the station is 159·96 acres and the area under cultivation is only 35 acres. The soil is poor and typical of the Nilgiri plateau. It is all dry land excepting two acres of swamp. There is a rest-house attached to the station for the conveneince of the visitors and inspecting officers.

2. Three crops of potatoes are grown on the Nilgiris known as the main crop, second crop and irrigated crop. The main crop is planted at the end of March or early in April, the second in August and the third in January-February and are harvested respectively in July, January and May. The main crop provides "seed" for planting the third crop and the second "seed" for the main crop. The irrigated crop provides seed for the second crop. The irrigated crop being grown during the dry months of the year is either planted in reclaimed swamp or is irrigated. The main crop should be grown on land sheltered from the south-west monsoon; otherwise considerable damage to this crop is caused by high winds.

Where necessary "seed" from the main crop can be stored for planting the main crop in the following year for a period of nearly eight months. If this is done, the "seed" should be selected from the larger tubers and they should be spread out singly on racks in a cool well-ventilated store. The loss from this method is generally high and varies from 20–40 per cent of the seed stored.

"Seed" from main crop can also be utilized for planting the second crop after storage of two months or less. If this is found necessary, the potatoes should be harvested as soon as the haulms show signs of dying down, thoroughly dried and stored in heaps in a warm room and covered with straw to a considerable depth. Fermenting stable litter can also be used, but care must be taken to see that it does not get too hot.

3. Different problems under investigation —

(1) Growing different varieties of potatoes, examination and isolation of these for compatibility to the conditions and disease resistance.

(2) Production of new varieties by selfing and hybridization.

(3) Trials with different ages, sizes of seed potatoes, and spacing in the lines to find out the best yield.

(4) Trials with different kinds of manures to find out the best ratio of Nitrogen, Phosphoric Acid and Potash.

(5) Trials of various green manure and grain crops that will suit in the rotation.

WHAT TO SEE AND WHEN TO SEE.

December-January.—Harvesting of second crop of potatoes. Deep ploughing with Sabul and Victory plough.

February-March.—Ploughing with "Victory" breaking clods with clod-crusher and harrowing with H.M. Guntakas to kill weeds. Planting irrigated potatoes.

March-April.—Forming furrows and ridges with double-mould-board ploughs along contours, mixing and application of fertilizers in the furrow, planting main-crop potatoes and covering. Drill sowing of samai and lupins for seed and green manure.

May-June.—Main crop potato in full growth, intercultivation of potatoes with cultivators drawn by single bullocks and earthing up by double mould-board ploughs. Intercultivating of cereals with H.M. Guntakas.

July.—Ploughing in of the green manure crop with "Victory plough" and preparing land for second-crop potatoes.

August-September.—Harvesting of main-crop potatoes by potato-digger and sorting potatoes for table and seed and planting of second-crop potatoes. Lupin crop for seed in full growth.

September-October.—Standing crop of samai and lupin and second-crop potatoes.

November-December.—Harvesting and threshing of samai and lupins.

Any time in the year.—Manufacture of good cattle manure in loose boxes and storing in manure pits, feeding of cattle, improved ploughs, intercultivators and harvesting implements, drills, etc., proper terracing and lay out of fields and drains, storing of seed potatoes in racks. Pasture ground with Kikuyu grass.

D. G. MUNRO,
Deputy Director of Agriculture, VIII Circle.

3. The Nilgiri Experimental Fruit Gardens.

There are three experimental fruit gardens in the Nilgiris maintained by the Agricultural Department, viz., the Pomological Station, Coonoor, and the Burliar and Kallar Experimental Fruit Gardens.

2. **The Pomological Station at Coonoor** adjoins Sim's Park and is situated at an elevation of 5,800 feet above sea-level. This station, established in 1920, is about 12 acres in extent and is almost completely planted up with fruit trees of temperate and sub-tropical climates, such as apples, pears, plums, peaches, quinces, guavas, persimmons, cherimoyers, loquats, figs, oranges, grape fruit and lemons. **The main objects of the station are to grow the different kinds and varieties of fruit trees that are likely to thrive on the hills of South India**; to test the different "stocks" and to use the most suitable for grafting purposes; to propagate those varieties and kinds that are most satisfactory and also to distribute them; to carry out experiments in pruning, manuring and cross pollination. Already ten varieties of Japanese plums have proved successful, the best five being the following which are placed in order of merit:-—"Hale," "Rubio," "Shiro," "Satsuma" and "Kelsey." The varieties "Hale," "Rubio" and "Shiro" are particularly valuable as they ripen during the latter half of

May at the height of the season when there is a great demand for fruit by the large number of visitors to the hills. The variety "Rubio" is useful for jam-making. "Shiro" is an excellent dessert fruit and "Hale" is suitable both for dessert and for jam.

About thirty varieties of apples are being tested, the most promising being "Rome Beauty," "Irish Peach" and "Winterstein," all of which produce fruits of excellent quality and are good growers.

The Japanese persimmon is also thriving and is gradually becoming popular for dessert purposes. Unfortunately this fruit tree cannot be propagated locally on a large scale as "stocks" are not available.

All the plums are budded on to peach seedlings which are easily obtainable locally. The apple is grafted on to crab apple suckers which are obtained from old grafted trees. For pears we have an excellent "stock" in the common China pear, cuttings of which take root easily.

The following is a list of the more important fruit plants for sale with prices noted against each :—

	RS.	A.	P.		
Oranges (grafted)	2	0	0	each.	Available from November to February.
Plums in all varieties	1	0	0	,,	
Apples in three varieties ...	1	8	0	,,	
Pears in six of the best varieties.	1	8	0	,,	
Peaches in two best varieties ...	1	8	0	,,	
Cherimoyer (seedlings) ...	0	4	0	,,	Available all the year.

Intending visitors to the station should notify the Farm Manager, if possible, some days beforehand that they wish to be conducted round. **All people visiting Coonoor interested in fruit-growing should make a point of seeing the orchard, the best time being in May or June when the fruits are ripening.** They should also make a point of visiting the Agricultural Show room situated near the entrance to the station and study the different specimens and charts showing diseases and pests, and their remedies. Any information they may require will be gladly given by the officer in charge, and fruit plants and acclimatized flower seeds can be purchased there. Government publications connected with agriculture are also offered for sale in these rooms and leaflets are issued free of charge.

3. **The Burliar Experimental Fruit Garden** is situated on the Coonoor Ghat, on the Mettupalaiyam-Coonoor road and is 2,500 feet above sea-level. The garden is suitable for the cultivation of tropical fruits and spices and contains fine specimens of the mangosteen, nutmeg, clove, cinnamon, mango, orange, langsat, litchi and allspice. The Para rubber tree also thrives there and one of the oldest Para rubber trees in India is to be seen in a small subsidiary garden near by. This tree was planted as long ago as 1882.

Numbers of mangosteen seedlings are being raised from seeds, the propagation of which is exceedingly difficult on account of the long tap-root, which, if it comes in contact with a large stone or is damaged in any other way, causes the seedling to die. This difficulty has been overcome by deep cultivation of the seed-beds and by placing the seedlings in long bamboo pots in which there is ample room for the long tap root to develop. The mangosteen fruit is in great demand by all who can afford to purchase it and sells readily for as much as Rs. 2 per dozen fruits. At a moderate estimate a mature tree will produce Rs. 50 worth of fruits annually and will continue to bear crops for a number of years. The

tree is unfortunately very slow-growing and takes from 10 to 15 years to come into bearing, but the cultivation of this delicious fruit should, in spite of this, be a very profitable proposition in suitable localities.

4. **The Kallar Experimental Fruit Garden** is situated half a mile up the old Ghat road from its junction with the new Ghat road at the foot of the Coonoor Ghat, about 5½ miles from Mēttupālaiyam. A notice-board will be seen at the junction of the two roads and there is another where the footpath to the garden branches off from the old Ghat road; so, there should not be any great difficulty in finding the garden, but if a week's notice is given, the officer in charge will make arrangements for visitors to be met and conducted to the garden.

The elevation of this garden is 1,400 feet above sea-level. It was opened in 1901 for the experimental cultivation of the Durian, a fruit much prized in Malaya, but owing to the interest then taken in rubber-producing plants, was planted with Para, Ceara and Castilloa rubber trees which served a useful purpose as seed bearers and for experiments in tapping. Some years ago most of the rubber was cut out and fruit trees planted. Many of these have already come into bearing, for instance, a giant variety of the sapodilla fruits regularly and is being propagated and distributed. Among the fruit trees being tested are the mangosteen, sapodilla, orange, avocado, papaya, mango, litchi, the different species of anona and citrus. The pine-apple is also being tested on a large scale. Other economic plants consist of medicinal and fibre-producing plants, the most noteworthy being *Ipecacuanha*, the successful cultivation of which has baffled planters in South India for more than half a century. The garden, in addition, contains a number of ornamental plants, and is well worth a visit. Plants available for sale at both Kallar and Burliar include the nutmeg, clove, cinnamon, allspice, langsat, custard apple, pine-apple, litchi, orange, pomeloe, mangosteen and guava at prices ranging from As. 4 to Rs. 2 each. **A complete list of these, and also the plants grown at the Pomological Station, will be sent by the Curator, whose office is at Ootacamund, on receipt of four annas.**

F. H. BUTCHER,
Curator, Government Botanic Gardens, Ootacamund.

4. Advice regarding the use of Iron Plough.

1. Use the right sort of plough for your particular soil and kind of work you wish to do. Consult the Agricultural Demonstrator in your taluk. Clay soils require a different style of mouldboard to that used for sandy soils. Chilled ploughs should be used for sandy or gravelly soils because of their greater resistance to wear than steel ploughs.

2. Study the soil conditions and do your ploughing when the moisture condition of the soil is right. If soils of certain compositions are ploughed too wet, the mouldboard will fail to shed the soil and if too dry, large clods will be formed. Special types of plough are made to meet each of these extreme conditions, but if possible you should arrange to do your ploughing when more normal conditions prevail in the soil to suit your normal type of plough.

3. Every day before using your plough see that all nuts are tight.

4. Keep your plough in correct adjustment to get good ploughing, to ensure minimum draught and to get the maximum service out of the share. Do not run the plough on its share point. The plough bottom should be

perfectly level on the sole of the furrow. The share point is already set down sufficiently to cause penetration. If the whole plough is tilted on to the share point the mouldboard is raised out of its correct position and the ploughing is poor. And the share point soon becomes worn out.

5. Yoke your bullocks as close together as possible so that the point on the yoke midway between the bullocks where you tie the plough chain or pole will be as nearly as possible straight in front of the plough. If the bullocks are yoked wide apart so that the midpoint on the yoke is a good deal to one side of the plough, you will have to lean the plough over towards the land side to prevent it taking too wide a furrow. If the plough is worked in such a position the mouldboard cannot function properly. The plough bottom should be quite level both sideways and endways.

6. If you use a headwheel on your short beam plough, do not use it as a means of regulating the depth of furrow. The depth adjustment should be made on the clevis on the front of the beam or by altering the length of hitch, and the headwheel adjusted afterwards so that it only lightly touches the ground.

7. Renew the share or share point as soon as it is due for renewal. A worn out share increases the draught and impairs the quality of the ploughing very considerably. Try to keep a high polish on the mouldboard so that it will shed the soil and do its work with the minimum of draught. Do not scrape the mouldboard with a stone to clean it. It should be kept perfectly smooth and free from scratches.

8. When ordering spare parts for your plough, specify the plough as fully as possible, giving the maker's name and the name and number of the plough, which are generally marked somewhere on the plough. If this information is not available, send the worn out part or an outline sketch of it along with your order.

9. Before putting your plough away till next season thoroughly clean it and apply some oil to the mouldboard and other wearing parts.

10. Prospective purchasers should select their plough from the list of approved ploughs given in this calendar. Some of the ploughs in the list are available for purchase in the Department's Agricultural depots.

N. G. CHARLEY,
Agricultural Research Engineer, Coimbatore.

5. List of Ploughs tested and approved by the Department.

1. **Cooper No. 25**, made by Messrs. Cooper Engineering Works, Satara. A very light plough with cast-iron body, steel mould-board and cast-chilled share, intended for loose, light soils. Ploughs a furrow up to 4 inches in depth and up to 5 inches in width. For use with pole and single handle. Can be drawn by smallest animals. Price, plough bottom with one extra share, Rs. 4-8-0; share, As. 5-6. Available from Messrs. Cooper Engineering Works, Satara, or Agricultural Demonstrators' depots.

2. **Gurjar No. 2,** made by Messrs. Kirloskar Brothers, Kirloskarvadi. Same as Cooper No. 25. Price, free on rails, any station in South

India; plough bottom with one extra share, Rs. 4–4–0; share, As. 6–6 Agents Messrs. Parry & Co., Ltd., Madras.

3. **Cooper No. 11,** made by Messrs. Cooper Engineering Works, Satara. A light steel plough with a cast-chilled share, highly recommended for loam and clay soils and soils that are sticky when moist. An excellent turning and scouring plough. Also recommended for wet land ploughing. Ploughs a furrow up to 5 inches in depth and up to 7 inches in width. Designed for pole and single handle. Can be drawn by smallest bullocks. Very light in draught. Price, plough bottom only, Rs. 7; share, As. 9; mould-board, Rs. 2–4–0. Available from Messrs. Cooper Engineering Works, Satara, or Agricultural Demonstrators' depots.

4. **Kirloskar' No. 14,** made by Kirloskar Brothers, Kirloskarvadi. Same as Cooper No. 11. Price, free on rail, Kirloskarvadi, plough bottom only, Rs. 7. Available from Messrs. Kirloskar Brothers, Kirloskarvadi or from their Madras Agents, Messrs. Parry & Co., Ltd.

5. **Ransomes' Jat,** made by Messrs. Ransomes, Simms and Jefferies, England. An all-cast iron plough with cast-chilled share. Suitable for general purpose ploughing in average soils. Ploughs a furrow up to 6 inches in depth and up to 8 inches in width. Can be fitted with a short wood beam and double steel handles or long pole and single handle. Requires a pair of medium-sized cattle. Share has a renewable point. Price, free on rail, Calcutta, plough bottom only with extra share, Rs. 22–8–0; chilled share Re. 1–8–0; share point, As. 6. Available from Messrs. Jessop & Co., Ltd., Calcutta.

6. **Ransomes' Monsoon,** made by Messrs. Ransomes, Simms and Jefferies, England. Same as Ransomes' Jat, but turns a furrow to the left instead of to the right. Prices and supply same as for Jat.

7. **Cooper No. 26,** made by Messrs. Cooper Engineering Works, Satara. An all cast-chilled plough with a sloping landside. Suitable for general purpose ploughing in average soils and more especially for sandy soils. Ploughs a furrow up to 6 inches in depth and up to 8 inches in width. Can be fitted with a short wood beam and double steel handles or with long pole and single handle. Requires a pair of medium-sized cattle. The share has a renewable point. Price, plough bottom only, Rs. 8–12–0; cast-chilled share with point, Re. 1–1–0; share point, As. 3–6; share, As. 14. Available from Messrs. Cooper Engineering Works, Satara, or Agricultural Demonstrators' depots.

8. **Kirloskar's Zamindar,** made by Messrs. Kirloskar Bros., Kirloskarvadi. Same as Cooper No. 26. Price, free on rail, Madras, or ex-Parry & Co.'s depots, complete plough with short wooden beam and double steel handles, Rs. 25; spare chilled share, Re. 1–4–0; spare point, As. 10. Madras, or any of their mufassal depots.

9. **Ransomes' Victory,** made by Messrs. Ransomes, Simms and Jefferies, England. An all-steel plough fitted with steel beam and single or double steel handles. Suitable for loam and clay soils. Ploughs a furrow up to 6 inches in depth and up to 9 inches in width. Requires a pair of good animals. Price, free on rails, Calcutta, complete plough with double handles, Rs. 40–12–0; spare steel share, Rs. 4–4–0. Available from Messrs. Jessop & Co., Ltd., Calcutta.

N. G. CHARLEY,
Agricultural Research Engineer.

6. Advice on the Problem of Manure Supply.

The problem of manure supply is becoming more and more serious because with the increase of population it becomes necessary to increase the produce from the same limited area by means of intensive cultivation and use of high yielding varieties. In other words as more plant food is removed from the soil a larger quantity of manure has to be applied lest the land should become impoverished and spoiled in the long run.

Our soils are naturally poor in phosphorus and organic matter which finally results in the supply of some nitrogen—two of the most important ingredients in plant food. In the absence of organic matter in the soil chemical manures alone do more harm than good. So our soils have to be supplied with more of organic matter to facilitate free application of chemical manures and to supply nitrogen side by side. This could be done by the use of oil-cakes but are costly material and not within easy reach of the ordinary ryot. That which is within his reach is cattle manure. So if he can increase its quantity and quality as well the problem is solved to a great extent because small doses of chemical manures like phosphate or potash manure in combination with good cattle manure make a rich complete manure.

In the circumstances it is worth taking any amount of trouble and care by the ryot to increase the quality and quantity of cattle manure. He is advised to give up at once the existing method and carefully follow the various methods described below so that whichever method is more profitable and convenient than the one in practice may be adopted :—

(*a*) *The Byre System.*—In this, the animals are tied under a pucca shed having an impervious floor sloping from the feeding trough to the drain which conveys the liquid manure to an urine pit outside the shed. The pit should also be a pucca one with impervious sides and bottom and have a good cover. The urine from this as it accumulates, is transferred to the manure pit. The manure pit like the urine pit should possess impervious sides and bottom and a good roofing to avoid exposure to sun and rain. In some cases the urine drain is connected to the manure pit. This system in the long run is economical.

(*b*) *Loose Box System.*—In this, the shed is made into compartments generally of a size which can hold a pair of work bullocks. The floor of the compartment is dug 2′–2½′ below ground level. The walls are built of brick and mortor and floor made non-absorbent. Feed is given in movable troughs. Every day the dung is spread evenly and thinly covered with refuse straw or litter. Dry leaves, weeds and other absorbing refuse can also be used along with litter in small quantities. As the animals move freely the urine too is spread and absorbed by the litter. The sides and margins have now and then to be trampled firmly with a sprinkling of water for uniform decomposition. This system ensures richness and increase in quantity of manure, but cannot be recommended for deltaic conditions, where underground water level is high.

(*c*) *Dry Earth System.*—In this, the floor of the cattle shed is spread over with dry soil to a depth of 6–9 inches on the top, preferably the floor should be dug to this depth and filled with loose dry sand. The dung and litter is removed daily to the manure pit. The urine soaks into the earth. Dry soil is thinly spread over wherever it becomes too wet. The floor is stirred frequently and a fresh surface exposed until it becomes saturated with urine when it is transferred to the manure pit and fresh soil is spread again. This system is less expensive and efficacious.

The manure pit should be provided with some sort of roofing to protect it against sun and rain. The dung and urine earth, etc., should be spread uniformly all over the pit.

(*d*) *Ordinary Floor and Trench System.*—In the work animals' shed along the central line of the floor where the animals generally urinate, dig a trench 1½ feet wide and 1 foot deep, pack it well with organic matter like litter, dry leaves, weeds (before they formed seed), rubbish from the threshing floor, etc., to absorb the urine. If such waste matter cannot be obtained sufficiently, fill up the trench with loose earth or sand and put a layer of litter, etc., on the top. The trench should be packed well bringing the stuff a few inches above the ground level as it is bound to sink gradually. When this material shows signs of decomposing too much or gets saturated with urine it has to be transferred to the manure heap and replaced with fresh stuff. In the case of female animals the same trench has to be dug close to their hind legs. When once the trench is dug no more attention need be paid to it except replacing fresh stuff in it whenever necessary. The floor of the shed can be kept clean and dry, catching every drop of urine. This incidentally tempts or forces the ryot to take care of all the organic waste matter and thus increases the quantity of his manure in a rich condition.

Thus the urine is caught without any expense. The dung, the litter, the urine held in the trench have all to be preserved carefully. The best thing is to store the above in a pit with a thatched shed over it. Where a shed cannot be provided, the manure may be heaped up on a raised floor and shaped in the form of an ordinary long or oval paddy straw stack and extended as it accumulates. The top, as it is shaped, is covered over with some earth and the manure thus stands slanting in the front. It would be better if this slanting front is also protected by one or two tatties. Thus the heap occupies less space and is little affected by the sun and rain. The only care that the ryot has to take is to see that the dung is scattered over on the heap and not thrown in lumps from the basket and that the heap is shaped properly as it accumulates and covered over with earth. This in short, seems to be the cheapest and easiest method for the ryot gaining his point side by side to a large extent in the conservation of cattle manure.

T. BUDHAVIDHEYA RAO,
Assistant Director of Agriculture.

7. Hints on the Resting and Forcing of Citrus Trees in the Northern Circars.

The following hints are given for the guidance of garden owners from the experience so far gained:—

(1) Attend to the free drainage of the garden during the rains, if necessary, by digging drains 1½-2 feet deep between the lines of trees. If the levels do not admit of the drains being free from stagnating water, use the archimedean screw and bale it out from time to time.

(2) Do not plough up the garden at the end of the rainy season until the surface is sufficiently dry. In heavy soils it may be allowed to crack and then dug up with a "Gaurdhalikam" or pick-axe.

(3) Dig up the soil around each tree to a width of about 4–8 feet without injuring any of the roots (except the fibrus ones) and remove the soil to a depth of about 6 inches (throwing it all round) so as to expose the lower layer, the drying of which facilitates the resting of the tree.

(4) When the tree has rested sufficiently, which may be seen by the leaves beginning to wither, fill in the pan around the tree with manure mixed with the earth removed.

(5) Do not use cattle-manure for citrus trees, at least for about 2 years before they commence to bear, as it has been found to induce foot rot. Sheep manure (2–4 baskets or 30–60 lb.) per tree, may be used instead with 3–6 lb. of sulphate of ammonia, 2–4 baskets of ashes and ½ to 1 cart-load of well dried silt according to the size of the trees.

(6) Irrigate the tree profusely once after the application of manure and lightly thereafter till the trees flower. Withhold irrigation or irrigate very lightly till fruit sets and thereafter resume irrigation again, increasing, its frequency and intensity as the summer advances.

(7) The normal flowering season of citrus tree is February to March, and the manuring and irrigation are best done about the middle of January, by which time the trees should be made to show signs of sufficient resting.

(8) By resting, manuring and irrigating the trees at set times, flowering may be induced earlier or later than usual, thus prolonging the season during which fruits may be available.

(9) By preventing the trees from bearing in the normal season by irrigating the trees from the time the rains cease (without resting or manuring the trees) till the usual flowering season passes away, they may be induced to bear a late crop ripening of from March to May, by cutting off irrigation during summer and manuring the trees at the commencement of the rainy season (June).

(10) In well-drained soils and in seasons of scant rainfall, flowering may also be induced in September-October by heavy manuring about a month earlier, especially in the case of trees which have not borne a good crop in the normal season.

G. JOGIRAJU,
Assistant Director of Agriculture.

8. Note on Pulichai Cotton Control Act.

Pulichai cotton originally introduced from Central Provinces has been grown in a number of villages in the Tinnevelly tract for several years with a perceptible increase in area during the last three years. Pulichai is a low grade cotton with a short and coarse staple and is grown principally because of its high ginning percentage. If marketed pure, the lint would be classed by the trade as Bengals and its value compared with Tinnevellies is too low to justify its cultivation. Unfortunately up till the present this cotton has been used for the dishonest purpose of mixing with better class local cotton with considerable detriment to the price and reputation of the cotton.

2. The extent to which the addition of Pulichai cotton to Karunganni cotton lowers the quality of the mixture may be shown from the following results obtained on an examination of pure Karunganni, pure Pulichai

and various mixtures of the two at the Technological Laboratory in Bombay :—

Cotton.				Counts that can be spun.
Pure Karunganni (C. 7) ...				30's
90 per cent Karunganni and 10 per cent of Pulichai				20's
80	do.	20	do.	16's
70	do.	30	do.	16's
60	do.	40	do.	14's
50	do.	50	do.	12's
Pure Pulichai				8's

3. The position became so grave that in order to protect the honest ryot who grows only Tinnevelly cotton and enhance the value of his produce, the Madras Government have been compelled to introduce legislation prohibiting the growing of Pulichai cotton in the districts of Madura, Ramnad, Tinnevelly and Coimbatore. This act known as the Cotton Control Act was passed in 1932 and its provisions will be enforced during the coming cotton season.

4. The main provisions of the Act are notified under sections 4 and 5 and are briefly as follows :—

Section 4 of the Act prohibits (*a*) cultivation of Pulichai cotton either pure or in any mixture, (*b*) mixing Pulichai cotton with any other kind of cotton, (*c*) possession, use or trade in Pulichai cotton in any form and further adds that any person contravening any of the above provisions, shall be liable to prosecution and to a fine amounting to Rs. 20 for the first, and Rs. 50 for any second or subsequent offence.

Section 5 authorises Gazetted Officers of the Agricultural Department to remove at the expense of the owner, all Pulichai plants found growing in fields and to seize all Pulichai kapas lint or seed wherever found, and reporting such to the higher authorities.

5. As the primary responsibility for the presence of Pulichai cotton rests with the grower, ryots and others are reminded of the desirability of carefully examining their cotton seed before sowing to see that it does not contain any Pulichai seed. In all cases of doubt the local Agricultural Demonstrator should be consulted. Applications and indents for pure cotton seed for sowing made to any Agricultural Officer will receive careful attention.

9. Some Common Insect Pests of our Gardens and their Control.

Frequent enquiries are received from different parts of the Presidency asking for simple control measures against some common insect pests found in vegetable, flower and fruit gardens. It is, therefore, believed that the following information might be of some help in devising suitable measures to control such pests.

Categories of Insects.—All insect pests can be divided into two convenient groups, viz., those that bite, tear and chew the plant tissue, and those that suck up the plant sap and allow the plant to fade and dry. Under the former are included grasshoppers, beetles and leaf caterpillars, and under the latter all the plant bugs, plant lice, scales, mealy bugs, leaf hoppers, etc.

SUCKING INSECTS.—The commonest among these are the following :—

(i) *Plant Lice* (Pēnu *or* Asukuni *or* Banka).—There are very few plants which are not infested by plant lice. These are small soft-bodied insects commonly found in colonies on the tender portions of plants, such as shoots, tender foliage, buds, flowers, etc. They feed by pumping up the plant sap from these tender portions. When a plant is badly infested with numbers of these lice, the shoots and buds suffer badly, the leaves become curled up, the growth of the shoots is checked, and the affected parts gradually dry up and wither. When closely examined each louse will be found to be provided with three pairs of legs, a pair of feelers and a sucking tube under the head. In addition to these is a pair of small tube-like projections, one on each side of the posterior end of the body. Ants generally visit lice infested plants in quest of the sweet liquid drops these creatures throw out. The great majority of the lice in a colony are wingless and move about slowly. The commonest example of a plant which suffers from the plant lice attack is the Lab-lab vine; thousands of the lice are often found completely covering the tender vines, shoots and flowers. Cotton, tobacco, brinjal, cabbage, radish, agathi, rose, mango and orange are other common plants often suffering from attacks of plant lice.

(ii) *Mealy Bugs.*—These affect the plants in the same manner as plant lice. But they differ in appearance. Mealy bugs are soft creatures generally covered with a powdery white bloom; some are profusely covered with this stuff while in others it is scanty and in some others the white covering is arranged as long processes proceeding from the body of the insect. The name of the bug is due to this covering. A common example of a mealy insect is the white cottony insect that infests crotons and other garden plants. Mealy bugs of different kinds infest different plants, such as cotton, brinjal, mango, sugarcane, pineapple, tomato, etc.

(iii) *Scale Insects.*—These injure the plants in the same way as the first two but in appearance they look like non-living things. Most of these are fixed to the plant during their adult condition and appear like scales on the plant surface. They infest shoots, branches and all tender parts. Fruit trees and industrial crops like coffee, tea, orange, etc., suffer most from them. Well-known examples of scale insects are the brown and green bugs of coffee which are often bad pests on the hill plantations. Familiar examples of these can be found on crotons, guava, lemon, nim, babul, mango and other common plants.

The above three groups are the most important among sucking insects commonly found on garden plants. Others occasionally noted are leaf hoppers, mealy wings and plant bugs of sorts.

BITING INSECTS.—These are not so common and persistent as some of the sucking pests noted above. The following may be put down as the chief :—

(i) *Leaf-eating Beetles.*—These include night-feeding cock-chafers on rose and other garden shrubs, epilachna beetles on brinjal, pumpkin beetles, small flea beetles often found on cabbage, radish, etc., and weevils of different kinds. The grubs of some of these attack the roots, shoots and stems of different plants also.

(ii) *Caterpillars.*—These are of various kinds including hairy, spiny, smooth, horned and looping forms of different colours and habits. Some of them feed on the leaves and buds, others cut young plants near the ground surface and some others bore into fruits and shoots. In these cases it is the young one (caterpillar) alone that causes injury and not the adult moths or butterflies.

(iii) *Grasshoppers and Leaf-cutting Bees.*—Grasshoppers usually attack very young plants, and some bees (not the Honey bee) cut the leaves of garden plants like rose, cassia, etc., and take away the cut portions to their nests.

Control Measures.—In the control of insect pests, prevention is always easier and better than cure. The cultivator should always have an eye on his growing crops and by experience must be in a position to foresee how and when an insect pest will appear, and avert its outbreak by prompt preventive measures. In the case of many of these pests, handpicking, netting, bagging, hoeing, pruning and similar mechanical measures will be found very effective and economical if resorted to at the early stages of insect damage. Insecticidal methods should be adopted only when other cheaper and more practical measures are found to fail. And even in this case, if the measure is adopted promptly there will be great saving in expenditure towards insecticide material as well as labour. A knowledge of the habits and life-history of the different insects will also go a great way in devising easy methods of control.

INSECTICIDAL METHODS.—With regard to the insecticides there are two different sets of them to suit the different habits of the two groups of biting and sucking forms.

FOR SUCKING INSECTS.—Generally against most of the common sucking insects, what are called contact insecticides are used. These affect the pest by coming into contact with its body and killing it by irritation or asphyxiation. The common substances are—

(i) *Soap Solution.*—A solution of any ordinary bar soap is a simple and cheap contact poison against soft-bodied insects like plant lice, mealy wings and delicate larvae. A potash soap remains in solution better and is more readily sprayed and effective against insects than soaps made with caustic soda. One pound of soap dissolved in five or six gallons of water will be found effective against plant lice or other soft insects.

(ii) *Kerosene Emulsion.*—This is one of the oldest known of insecticidal preparations and is generally prepared on the spot when wanted; the usual recipe is as below:—Finely divide half a pound of soap and dissolve it in a gallon of water by boiling; remove the fire and add 2 gallons of kerosene. The whole mixture should be violently agitated, until the oil is completely emulsified; this may be done by being pumped upon itself by a force pump. If well prepared, this emulsion will keep long as the stock solution and can be diluted with 15–20 times of water before spraying; it may be made stronger or weaker according to the kind of insects and nature of the plant. With hard water more soap should be used. To make the spray stick to the surface an ounce or two of glue may be added to the mixture before spraying.

(iii) *Fish Oil Rosin Soap.*—This is a ready made insecticide sold at the Kerala Soap Factory, Calicut, Malabar, at 5 annas per pound. It is available as a dark brown semi-solid stuff which can be readily mixed with cold water and sprayed on the plants to check all kinds of sucking insects—especially plant lice, scales, mango-hopper, etc. The usual dose is one pound of the soap to 8 gallons of water; the strength of the mixture may be made strong or weak according as the insect to be treated has a hard or soft covering. In the case of hard scales the dose may be strengthened in the proportion of 1 pound of the soap to 4 or 5 gallons of water. In some cases a second or third spraying may be found necessary to tackle recently hatched nymphs, or those that escape the earlier sprayings.

(iv) *Tobacco Decoction.*—Tobacco and its products are some of the best known of insecticides at present available; there are various standard preparations of tobacco (nicotine) sold under different names. For all practical purposes tobacco decoction can be easily prepared when wanted as below:—Boil a pound of tobacco (the refuse stems and powder will do very well) in a gallon of water for half an hour or by steeping it in cold water for a day. In the tobacco decoction, dissolve four ounces of any ordinary bar soap. This soap and tobacco mixture when cool is to be diluted with six or seven times of water and sprayed on the infested plants. This will be found useful against plant lice and mealy bugs affecting all plants, especially on those where the foliage is used and where one would like to avoid the smell of kerosene or fish oil. This is the case when the tobacco plant itself is attacked by plant lice as is very often the case. Soap when used with tobacco has been found not only as a good spreader but also to appreciably increase the efficacy of the nicotine agent. Tobacco decoction has been very much in use recently against plant lice on tobacco in different parts of the province. As an easily available stuff and an effective preparation against most sucking insects tobacco has a very promising future as an insecticide. Dry tobacco dust mixed with some lime or powdered ashes is also used often as a side-dressing to prevent insects attacking young and low growing plants, like onions, chillies, etc., and tobacco smoke will act as a fumigant against very small and delicate insects.

For Biting Insects.—Generally against all common biting insects the above substances can also be used in some cases as deterrents or even killing agents, but the more economical and effective methods are the use of what are called stomach insecticides which when mixed with the food of the pest kill it by poisoning. Stomach insecticides will not be effective against sucking forms. The following are the most commonly used and very well-known stomach insecticides and most of these stomach insecticides are arsenic compounds:—

(i) *Lead Arsenate.*—This is a white substance produced from the ingredients lead acetate and soda arsenate. It is insoluble in water, harmless to plants, and easily applied either in the liquid form or as a powder. It is procurable either in the form of a paste or as a dry powder at about Re. 1 per pound. The usual proportions are, in the paste form 1 ounce to 4 gallons of water, and in the powder form $\frac{2}{3}$ of an ounce to the same quantity of water. There is no risk even when a slightly stronger dose is used. Its efficacy in spraying may be increased by adding some molasses and lime to the mixture, the usual proportion being 3 pounds of lime and 6 pounds of molasses for every pound of arsenate used. As a dry powder it is generally mixed in the proportion of 1 pound of the powder to 10 or 15 pounds of some neutral powder like wood ashes, powdered lime or road dust and dusted. Though slightly costlier, its safety as regards foliage burning and its adhesive quality make lead arsenate a safe, effective and popular stomach poison, and its use all over the world has met with considerable success.

(ii) *Calcium Arsenate.*—This insecticide is more or less similar to lead arsenate. It is also sold as a white powder and is cheaper than lead arsenate costing about twelve annas a pound. It can be used in the same way as lead arsenate either in the form of a liquid spray or as a dry dust.

Many of the stomach insecticides can be used as insect baits also in various ways to trap cutworms, underground insects, grasshoppers, ants, locusts, etc. The usual method is to mix very small quantities of these

arsenicals with various attractive and sweetened food materials like flour, bran, potatoes, etc., and leave small bits of these poisoned baits in the haunts of the various insect pests ; this poisons and kills them in numbers.

In using these arsenical stomach poisons it must be remembered that they are all poisonous, and, as such, all proper precautions should be taken to see that there is no danger to human beings, cattle and other domestic animals. The materials should be kept properly labelled as poison and should be handled only by responsible persons. Usually the sprayed or dusted poison completely disappears from the plant in about three or four weeks and there is no danger in using the foliage. It is advisable, however, not to spray arsenicals to vegetables, etc., but if found necessary to do so, it must be done three or four weeks before harvest and it is better to use vegetables, fruits, etc., plucked from sprayed plants after washing them well.

General Remarks.—Spraying and dusting should not be done when the weather is unfavourable, especially when there are strong winds or heavy showers. Dusting is best done in still weather and during early morning hours when the leaves are wet with dew and will retain the dusted powder. For the efficient and economic use of insecticides the necessary spraying, dusting and fumigating machinery should be used, and these machines kept in good condition after each operation. Owners of gardens will do well to stock small quantities of these common insect killing materials and the spraying and dusting appliances of which latter there are different kinds available in the market.

For any further details, communications may be sent to the undersigned.

T. V. RAMAKRISHNA AYYAR,
Acting Entomologist, Lawley Road P.O., Coimbatore.

10. Control of the House-fly.

Every one would feel it a great nuisance when the little creature commonly known as the house-fly appears in large numbers during certain seasons in the year and worries him by sitting on his body and limbs, his food and other household materials ; but very few would have realised the greater and more dangerous feature of the insect, i.e., the fact that when it sits on one's body and food it is transferring to these certain invisible organisms known as *Bacteria* which are responsible for a number of deadly diseases like Cholera, Typhoid, Dysentery, etc. If men realised that, in both the ways mentioned above, the house-fly is one of the greatest enemies of mankind, they will not be so indifferent in the matter of over coming this nuisance. It is only in recent years that the destruction of flies has come to be considered as one of the important items of sanitation in any locality. The best way of attacking the above diseases is by trying to destroy the fly population of the place.

It may be too much to expect to be able to wipe out the flies of any locality but it is certainly within practical politics to keep their number within reasonable limits. The methods of controlling flies depend largely on a knowledge of their life-history and habits as in all cases of insect control. Just like any other insect the house-fly passes through three distinct stages before it assumes the adult stage. From the long white cylindrical eggs which are laid in masses of 100 or 150 by the mother fly in manure or other decaying material hatch out in a day, small legless dirty

white wriggling creatures which have a pointed head end and a tail end truncated. These feed voraciously and become full grown in a week's time when they are fleshy and yellowish white in colour and have a springing movement when disturbed. These get into drier places and change into barrel shaped reddish brown pupae from which the adult flies emerge in the course of 3 or 4 days. The common house-fly is grey in colour with four narrow black stripes on the thorax and only one pair of transparent wings, the other pair being represented by two laddle shaped structures. Flies feed on liquid food only and the mouth parts are adapted to this habit.

Flies can be destroyed either when they are in the adult stage or when they are maggots. The adult flies may be killed by placing bundles of straw, leaves and other materials dipped in a solution of treacle to which a poison like sodium arsenate is added, near their breeding grounds or by exposing in such places formalin and milk in shallow plates or by attracting them to traps with attractive baits put in them, the traps being so made that flies can freely enter into them but not escape from them. One such trap known as the "Minnesota fly trap" has been tried and found to be effective when rotting flesh is used as bait. About 3,000 flies have been caught in one trap on a single day. The flies are then killed by being dipped in hot water. But this trap has the greatest disadvantage especially when used in residences in that the rotting mutton has a very offensive smell. Flies may also be killed by attracting them to what are known as fly papers, i.e., papers, the surfaces of which have been painted with some sticky substance, made by boiling equal quantities of castor oil and resin and adding to this a small quantity of jaggery or treacle. If this substance is smeared on small pieces of wires and the latter are hung in places infested with flies, a large number of these are trapped because of the natural tendency of flies to cling to any wire or rope. This method has been found very successful at Coimbatore and the fly nuisance very appreciably reduced in the course of three or four days.

As manure heaps are the places which act as regular breeding grounds for the flies, storage of manure in such a way as to prevent fly breeding will be the best method of controlling flies. This is done by disposal of the manure as it accumulates without storing it for a long time. But in the case of agriculturists it may not be practicable, as the manuring operations come in only at certain seasons and not always and consequently manure has to be stored. In such cases, fly breeding can be prevented by putting a layer of soil about 2 inches thick over every day's accumulation when storing manure in pits or by enclosing the manure pits with fly proof wire gauze to prevent entry of flies for egglaying. Flies may also be prevented from multiplying by trapping and killing the maggots before they are able to emerge as adult flies by the use of what is known as a maggot trap. This has been tried at the Coimbatore Central Farm and found to work very satisfactorily in keeping down the fly population to a great extent. There were instances when more than five thousand maggots were caught in a day in one trap.

This trap works on the principle of attracting flies to a manure heap in a receptacle to make them lay eggs, trapping the maggots that hatch out of these taking advantage of the migratory instinct of the grown-up maggots. Thus the maggots are prevented from becoming adults and multiplying. The maggot trap that has been under trial at the Coimbatore central farm consists of a rectangular wooden frame of any convenient size (say 2′ × 2′ × 2′) fitted with half inch mesh wire netting on all sides, open

at the top and provided with a plank at the bottom about 6″ from the ground level. All round the trap at the level of the plank is a U-shaped drain of galvanised iron fitted with ledges on either side slanting towards the drain. The drain is filled with water which can be drained when necessary through a hole at the bottom on one side which is plugged with a cork. The trap is placed near cattle sheds or other places where flies abound and fresh manure is put into it daily. Attracted by the fresh manure, the flies come and lay eggs in the trap. The maggots that hatch out begin to wander about and move towards the exterior due to the heat produced by the fermentation of the manure in the middle; in so doing they come out through the meshes of the wire netting and fall into the drain round the trap and are caught there, being unable to get out of it because of the slanting ledges. The maggots are collected daily or once in two or three days and destroyed. The water in the drain is also renewed. From a trap containing about 1,500 pounds of cattle manure over 5,000 maggots have been caught in a day. But this high catch does not last long as the manure gets dry and no further egglaying of flies goes on; moreover the drier portions enable some of the maggots to pupate and emerge as flies But even when this happens a good percentage of just emerged adult flies fall into the trap and are caught. On one occasion, as many as 453 flies were caught in a trap on a day. This defect may be remedied by wetting the manure daily; but even this condition is not quite ideal for attracting flies to make them lay eggs. A constant supply of fresh fermenting manure in the trap seems to be quite essential for the successful working of the maggot trap and this condition has been obtained by having a series of at least three such traps put up and each filled in at definite intervals. These traps are being tried in various other agricultural stations in the Presidency and the results awaited.

More information on this trap can be had from the Government Entomologist, Coimbatore.

11. General Principles of Plant Disease Control.

Apart from the ravages of animals and insects, crop plants suffer from another series of diseases brought about by other agencies known as "Fungi" which cause serious loss of crop. In trying to find out a way for stopping a disease from appearing and spreading, it is always necessary to attack the fungus in more than one way. First of all, one must see that the economic plant is situated in favourable surroundings. We raise crop plants under conditions in which they produce the maximum amount of useful plant product and our aim at the same time is to get healthy plants. There is always a balance between plants and condition and if we alter the balance by forcing products, the health of the plant suffers. There are a number of elements known as parasitic plants which are ready to take advantage of the slightest weakness in the host. For instance, crops like coffee and orange become susceptible to disease after heavy or continuous over-bearing. Some have so perfected this parasitic habit that they are able to attack and destroy even the healthy plants. Methods for the control of fungus diseases of plants are

(1) General sanitation.
(2) Rotation of crops.
(3) Seed selection.

(4) Growing of disease resistant varieties.
(5) Application of fungicides.
(*a*) to the seed.
(*b*) to the growing parts of plants.

To give plants a suitable environment is the first thing to think about, to clean away anything which might injure them is the next. The destruction of diseased material is an important method of keeping the disease away. Diseased plants, fruits, leaves or twigs and branches can often be destroyed at little expenditure with beneficial results. To burn the diseased material at the first appearance is the safest way to destroy it. If this is not practicable, to bury it at a sufficient depth in a pit with a substance like quick lime is the next best thing that could be done. Several instances within practical experience may be quoted to prove the need for prompt destruction of diseased material. In the case of bud-rot of palmyra and coconut the dead crown is cut down, split into pieces and burnt. In coconut palms affected with bleeding disease, the affected portions are chiselled out, the diseased bits are burnt and the wounds painted with hot tar. In the "die-back" disease of oranges and limes, the diseased branches are pruned, the prunings destroyed by fire and the cut surface covered with tar. In the case of orange "foot-rot" and gummosis, the rotten portion of the bark is excised and the wounds painted with Bordeaux mixture. In the case of the Mahali disease of arecanuts, the old diseased bunches and leaf sheaths hanging from the trees or lying about in the garden are collected and burnt prior to the monsoon and a protective spray applied to the new bunches. There are other cases where a whole plant should be pulled out and destroyed as in the case of cotton and red gram wilt. In the case of some root diseases as for example "foot-rot" of arecanut, it is impossible to save the affected tree from dying and hence it should be isolated from the rest by digging a trench all round to prevent the disease from spreading to the other healthy trees. Diseased material should be never put in a manure heap because the spores germinate and produce many spores in the manure. As far as possible diseased material should not be moved about from field to field. For example, if paddy or ragi straw infected with Piricularia is transported from diseased fields, it is likely to spread infection to healthy fields. Care should also be taken about the coolies working in the fields so that they may not carelessly spread any disease from field to field.

The principles involved under plant sanitation are identical with those followed, in dealing with infectious diseases such as plague, cholera and smallpox in man and anthrax rinderpest and other diseases among animals. For the abovementioned measures to be a success, the co-operation of neighbours is essential. This is perhaps not quite easy but not impossible. The bulk of one's neighbours does generally co-operate and we have only to persuade the few who are against such co-operation. The Pest Act is necessary when the refusal of a few to help in a general scheme of sanitation is likely to be harmful to their neighbours.

Plant Quarantine.—When seeds are obtained from a new locality it is necessary that we make sure no disease material is carried along with them. So they should be carefully examined and fumigated before they are planted. In the case of plants, they should in the first instance be planted in an isolated place for a sufficient period to ensure that no disease is present. In case any disease shows itself out, the plants should be completely destroyed by being burnt.

Rotation of Crops is a means to prevent the spread of disease. The spores or the mycelium of many parasitic fungi can remain alive in the soil for a considerable time (several months or several years). If the host plants of such fungus are grown in the soil infected in this way by a previous crop they have a fair chance of becoming badly infected with the disease. As an example we may mention the wilt disease of groundnut caused by *Rhizoctonia* or the wilt of betel-vine caused by *Phytophthora*. It is possible to prevent the yearly occurrence of such diseases by the practice of a suitable crop rotation. One or more crops which are not attacked by the fungus which causes the disease are grown for a certain period on the ground with a view to starve the fungus. Similarly, the bacterium causing the ring disease of potatoes in India lives in the soil for more than one year. In the Nilgiris where for various reasons two crops of potatoes are grown on the same land year after year, this disease is severe and the produce is reduced very much.

Seed Selection is in some cases the natural means of controlling a disease. The disease is carried over from crop to crop by diseased seed, for example, Anthracnose of bean. It has been demonstrated that diseased pods almost always contain diseased seeds even though no spot is visible on the seed coat. Treatment of sadi seeds with a fungicide is not effectual. In selecting seed for sowing, one should choose seeds only from pods that have no discolouration on the surface and discard all from discoloured pods. In cases like red-rot of sugarcane, the disease is perpetuated chiefly through planting diseased setts. By careful selection of healthy setts for planting the disease can easily be controlled. Sugarcane "mosaic" is another example of a disease which can be controlled by sett selection.

Growing of Resistant Varieties.—The individuals of a variety or varieties of a species are not attacked to the same extent by any given parasitic fungus. Some individuals or varieties are always attacked. Others are attacked only occasionally. By patient, careful labour these plants may be selected till a definite variety is got that is resistant to the attack of the particular fungus. The resistance may however be inherited or it may vary as the climate or soil conditions change. It has been found that a variety of a plant that is resistant to a disease in one locality is not necessarily resistant to it in another locality. In the case of crops like paddy and sugarcane, there are several varieties existing which are resistant to one or more disease. For example, G.E.B. 24 and Co. 4 are highly resistant to "Blast" disease of paddy. Attempts made at Coimbatore to evolve a strain of Korangu samba paddy resistant to Piricularia are nearing fruition.

Application of Fungicides to the seed and the growing plant is an important means of disease control. Such application is generally made to protect the plant from an attack of the fungus. In only a few cases it is possible to kill a fungus that is actually present and is causing injury. In most cases the seed or plant receives a covering of fungicide in order to prevent the germination of spores that may subsequently fall on it. A solution of chemicals like formalin, corrosive sublimate or copper sulphate kills spores of many fungi or prevents them from germinating. Some chemicals in dry form, e.g., sulphur and ceresan are also capable of killing fungus hyphae or spores adhering to seeds. Seed-borne diseases like "smut" of cholam and tenai and "foot-rot" of paddy can be prevented by treating the seed with a suitable chemical disinfectant. Copper sulphate solution is used as a seed disinfectant ; but when it is sprayed on

live plants it causes scorching of leaves. This defect has been got over by mixing slaked lime with the copper sulphate solution to form a mixture in water. This mixture is known as Bordeaux mixture and the best known among spraying mixtures.

Under South Indian conditions Bordeaux mixture of different strengths has been successfully used against the following diseases among others :—

(1) Mahali or Koleroga disease of arecanuts.
(2) Fruit-rot and die-back of chillies.
(3) Leaf-spot of turmeric and ginger.
(4) Rust and black-rot of coffee.
(5) Secondary leaf fall of Hevea rubber.
(6) Mildew and Anthracnose of grapes.
(7) Mildew and fruit-fall of mangoes.
(8) Mildew and die-back of orange and lime.
(9) Fruit-rot of pomegranate.
(10) Early blight of potatoes.
(11) Wilt of betel-vine.

While Bordeaux mixture is the easiest and best known, there are other fungicides like Burgundy mixture, lime-sulphur solution, potassium sulphide, flowers of sulphur, etc., which are used for the same purpose but under a variety of conditions. "Flowers of sulphur" has been used successfully against mildew of grape-vine and rust on fig. Recently several proprietory preparations of copper and sulphur are being placed on the market which serve the same purpose.

It must be remembered that most of the treatments for fungus diseases of plants are preventive and not curative and so timely attention paid to the small sanitary and preventive measures enumerated above will go a great way in producing healthy crops which will pay amply for the labours of the ryots. Appended is a calendar which shows some of the important crop diseases and when and how to deal with them.

For further particulars and instructions regarding the most suitable remedy to be adopted against specific diseases, please apply to the *Mycologist, Lawley Road P.O.*

S. SUNDARARAMAN,
Government Mycologist.

30*th May* 1934.

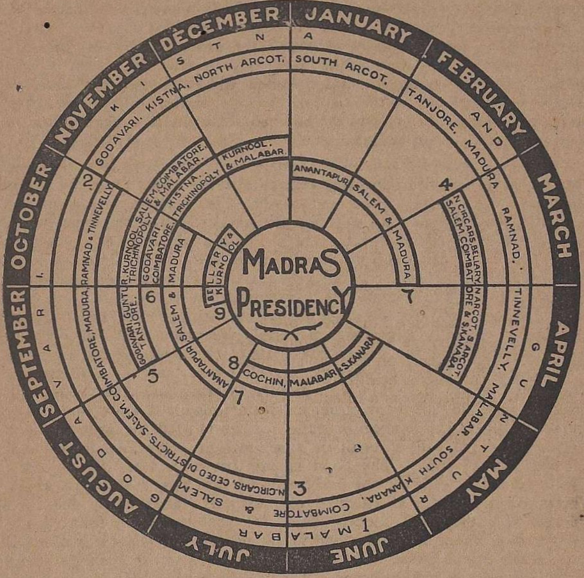
12. Beetles damaging Coconut Trees in South India.

In almost all parts of South India where the coconut tree is grown it is found to suffer from the attacks of some insect pests. Among these the well-known ones are the coconut beetles of which the one is the black or rhinoceros beetle and the other the red palm weevil. The following brief notes are added to give coconut growers some idea of these insects, the injury they cause, and the possible control measures against them :—

THE RHINOCEROS BEETLE (ORYCTES RHINOCEROS).

The Insect and the Nature of Damage.—As far as we know of these coconut infesting beetles in South India, the commonest and the more widely distributed appears to be the rhinoceros beetle and frequent reports are received from different localities on this insect. It is known as *Thennan vandu* in the Tamil tracts and *Chellu* in Malayalam. The rhinoceros beetle is so called because of the conspicuous conical horn-like process it has on

CAMPAIGN CALENDAR OF FUNGUS-DISEASES OF ECONOMIC CROPS.



1. Palmyra and coconut bud-rot. The dead crown is cut down, split into pieces and burnt.
2. Coconut and arecanut—Stem-bleeding disease. The diseased portions are chiselled out, the diseased bits burnt and the wounds painted with hot tar.
3. Cholam Smut. Steeping seed in copper sulphate solution or treating seed with fine sulphur.
4. Sugarcane red-rot and mosaic. Sett selection and roguing of diseased plants.
5. Chillie fruit-rot. Bordeaux mixture spraying.
6. Turmeric leaf-spot. Do.
7. Grape-vine mildew. Do.
8. Arecanut mahali. Do.
9. Tenai smut. Steeping seed in copper sulphate solution or treating seed with fine sulphur.

its head. It is a stout built dark shining beetle measuring about two inches in length. Though commoner in the coastal districts of South India where coconut tree is cultivated in large areas it is not absent in the coconut tracts of the inland districts, and occasional reports are received about the pest from these localities also. The injury done to the tree is caused by the adult beetle burrowing into the growing tender parts of the crown, cutting holes into them and feeding on the juice that exudes from the cuts made, throwing away the chewed fibrous matter. In some cases if the beetle burrows further and reaches the growing bud, the attacked tree may die. Both young and grown-up trees are attacked. The presence of the insect or the signs of its work may be detected chiefly by the partially attacked tender shoots and fronds, and the presence of lumps of chewed fibrous matter at the base of the leaf stalks. The result of its attack on older trees is seen in the notched and trimmed appearance of the attacked leaflets on expanding.

Life-history and Habits.—The female beetle lays its white oval-shaped eggs generally in dead or decaying vegetable matter which forms the food of the young one. Though the insect may breed in decaying parts of infested coconuts, dead stumps, etc., eggs and the larval stages of the creature are not generally found on healthy trees. Within about 12 to 14 days the eggs hatch into small fleshy grubs with pale white body, brownish head and well-developed legs. These grow in size by feeding on the rotting vegetable matter and become full-developed grubs in about three or three and a half months. At this stage the grub is a stout fleshy and wrinkled creature 4 inches in length with powerful jaws and curved body with the head brownish and the body dirty white-blackish towards the hind end. This grub is the familiar "*manure worm*" often found in decomposing heaps and which are eaten with avidity by crows and other birds; it is, however, possible that many of our cultivators may not know that this is the young one of the rhinoceros beetle. When full-fed the grub makes a cocoon or pupal cell of earth or some foreign matter, inside which it changes into the pupa. The pupa is pale brown and has the form of a miniature beetle showing the rudiments of the legs, feelers and wings. The pupal period lasts about three to four weeks after which the pupa changes into the adult beetle. Thus, for one generation from eggs to adult it takes about four and a half to five months. Usually it is only the adult beetle that is found on healthy coconut trees and the younger stages are always seen in manure heaps. The beetle is nocturnal in habits and is sometimes found coming towards lights in houses.

THE PALM WEEVIL (RHYNCHOPHORUS FERRUGINEOUS).

The Insect and the Nature of Damage.—Though this beetle has been occasionally noted on coconut trees in South India, it does not appear to be so commonly reported as the rhinoceros beetle. It is, however, reported to be a more serious pest than the rhinoceros beetle in Ceylon and other tropical regions. Unlike the latter the red weevil does not cause any damage to the trees in the adult stage; it is only the larval stage of it that is responsible for the damage. The insect is reddish brown in colour and has a prominent pointed and curved feeding snout which is the chief feature of all weevils. It is known as the red beetle or *Sevandu* in Tamil.

Life-history and Habits.—In the case of this insect all the stages, egg, grub, pupa, and adult are noted on the infested trees. The female insect generally deposits its eggs in openings in the soft parts caused by any wound or hole or cut made in the tree and each female is capable of laying over

a hundred eggs. Each egg is about half an inch long, slender and white in colour. Within a week these hatch into small whitish fleshy grubs. Unlike the grub of the rhinoceros beetle these have no legs and appear as mere lumps of flesh and move like worms by the contraction and expansion of the body; the head is brownish and has strong jaws to help the creature to burrow into the soft portions of the tree. For two or three months the larva feeds and grows in size, and when fully developed it measures about an inch and a half in length and in general features resembles the just hatched grub. At the end of the larval period the grub constructs a hollow cylindrical cocoon made of fibrous matter around itself in the burrow where it was feeding and changes into the pupa which is a miniature weevil showing rudiments of legs, wings and the snout. In another two weeks the pupa comes out of the cocoon as the adult weevil.

Other Food Plants in South India.—Both these beetles are often found on the palmyra, date, sago and other palms also.

CONTROL MEASURES.

In devising control measures against these two pests the coconut planter will do well to note the more important differences in general features, habits and life-histories between the two. In the case of the beetle it is the adult that does the damage to healthy palms; its younger stages are generally found only in dead palms, manure heaps and other decaying vegetable matter. On the other hand the adult weevil is not itself capable of causing any damage to healthy palms: the actual damage is done by the fleshy grubs. The weevil is responsible only for laying eggs, into the trees; this she is able to do only when there are serious cuts or wounds on healthy trees. Occasionally the damage caused by the rhinoceros beetle attracts the weevil to lay eggs and in such cases both the rhinoceros beetle and the weevil grubs may be found causing damage together. This association between the two beetles helps the weevil considerably. The control measures against these two can be both preventive and curative.

Preventive Measures.—Coconut gardens should be kept clean and periodically examined to see that the trees and surroundings are in good condition. All crownless palms including palmyra, date, etc., diseased trees and dead stumps should be removed, or split open and dried to prevent the beetles breeding in them. Manure pits and rubbish heaps should be periodically overhauled and the grubs of the rhinoceros beetle destroyed or exposed to the work of crows and other birds. The soft parts of the trees should not be injured or damaged in any way and the wound left exposed. It is believed that the weevil generally follows the rhinoceros beetle and as such, proper attention paid to check that beetle will prevent egg-laying by the red weevil which is generally attracted by the smell emanating from cuts and wounds on trees or exudations from diseased trees; all such parts should be covered with clay mixed with some tar to prevent weevil attack.

Curative Measures.—The coconut beetle can be extracted from infested crowns by means of a hooked wire and destroyed. This is a method generally adopted in many gardens and rewards are often offered to beetle catchers either in cash or kind. This extraction should be done very carefully and the passage thus produced may be plugged with cotton wool or fibre soaked in tar or a mixture of tar and sand. A handful of a mixture of salt and sand can also be put into the passage. All beetles collected in the gardens should be destroyed. In some places beetles are attracted

in some numbers by exposing in the gardens fermenting starch or water mixed with kitchen refuse, etc. Sometimes beetles can also be collected at lights and these destroyed promptly. In South India the weevil has practically never been noted on healthy coconut trees. Trees suffering from bleeding disease invariably harbour the weevil as a secondary pest.

T. V. RAMAKRISHNA AYYAR,
Entomologist, Lawley Road P.O., Coimbatore.

13. Useful Recipes for Treatment against Fungus Diseases.

I.—Bordeaux Mixture (1 per cent strength).

Copper sulphate	5 lb.
Quicklime	5 ,,
Water	50 gallons.

Dissolve the copper sulphate in 25 gallons of water in a wooden, earthenware or copper vessel. Place the quicklime in another vessel by sprinkling some water over it and add more water till a creamy paste free from lumps is formed. Add the remaining water to the lime and stir well. Slowly strain this milk of lime into the copper sulphate solution stirring the mixture well all the time.

To test the mixture, dip a polished knife blade or other piece of iron into the mixture for about a minute. If the blade shows a reddish deposit of copper, add more lime till the clean blade is not stained when dipped afresh in the mixture.

II.—Alum Bordeaux Mixture.

Copper sulphate	4 lb.
Potash alum	4 ,,
Lime	6 ,,
Water	50 gallons.
Casein	1 lb.

To prepare 50 gallons of the mixture—

(*a*) Dissolve 4 lb. of copper sulphate and 4 lb. of potash alum in 24 gallons of water in a copper, wooden or earthenware vessel.

(*b*) Dissolve 5 lb. of quick lime in 24 gallons of water. Mix (*a*) and (*b*) stirring the mixture well all the time.

Casein 1 lb. is soaked in one gallon water and dissolved in lime water (1 gallon of water and 1 lb. of lime) and this solution is added to the alum Bordeaux mixture as adhesive.

III.—Lime Sulphur.

The following proportions of ingredients are required for 50 gallons of mixture (stock solution) :—

Quicklime	50 lb.
Sulphur powder	100 ,,
Water	50 gallons.

Place enough water in the cooking vessel (which may be of iron or zinc but not copper) to finish with 50 gallons of the solution. Bring to boil and stir well adding the lime. Then add the sulphur and keep

stirring. Boil the mixture for about an hour till an orange-red liquid with a sediment is formed. Strain off the sediment through a piece of coarse gunny. This is the stock solution which should be diluted with water before use. For spraying the freshly pruned stem, dilute the stock solution with five parts of water. For spraying the foliage, dilute with fifteen parts of water.

N.B.—The stock solution may be preserved for future use, if filled and stored in airtight vessels. A thin layer of kerosene over the stock solution will preserve it from the action of air.

IV.—The use of Sulphur against the Short Smut of Cholam.

The treatment consists of dusting the dry powdered sulphur on the dry seed. The powder should be mixed thoroughly with the seed so that each grain gets a uniform covering of the powder. Four ounces of powder will be required for treating 60 lb. of seed.

The advantage of this treatment over the old method of steeping the seed in copper sulphate solution before sowing is—

(1) that it can be applied dry;
(2) the treatment could be done at any time;
(3) the treated seed can be stored for several months;
(4) there is no fear of under-treating or over-treating the seed; and
(5) the cost of treatment which is now six pies per acre (copper sulphate treatment) can be reduced to one pie.

S. SUNDARARAMAN,
Mycologist.

14. The Mosaic Disease of Sugarcane.

A disease of sugarcane called Mosaic disease or "mottling disease" has been known for some years in sugarcane-growing countries. It has been noticed in several provinces in India. In the Madras Presidency, the disease was first noticed during 1923 and it has so far been reported to exist on a small scale in portions of East Gōdāvari, North Arcot, South Arcot, Chittoor, Chingleput, Coimbatore, Trichinopoly and Malabar districts.

Symptoms.—As the name implies, the disease is characterized by a peculiar mottling of the leaves. From a distance a badly diseased field shows a yellowish instead of the healthy dark brown colour. On close examination the discolouration is found to be due to innumerable whitish, or at times yellowish, blotches on the leaf surface. As a rule the disease is found on the leaves. In some canes the mottling tends to become obscured as the leaf gets old so that it is difficult to detect it on the other older leaves. The symptoms of the disease are, therefore, unmistakably found on the youngest leaves of the shoot and they are invariably visible as soon as the leaves unfold. In some varieties of cane, a kind of mottled appearance due to causes other than the mosaic disease is found confined to the old lower leaves, while the young leaves are quite free, so that one has to depend on the examination of the spindle to satisfy oneself that it is not a case of mosaic. The disease is also to be differentiated from entire chlorosis of the leaves where the whole leaf turns white or yellow and from partial chlorosis where yellow stripes run along the whole length of the leaf.

Cause of the Disease.—It is caused by a "virus". You cannot detect it even under the most powerful microscope.

Estimate of Loss due to Mosaic.—The disease does not kill the cane. In advanced cases of infection the stem gets shrunk and the rind cracks. In other countries where the disease has been in existence for several years, material reductions in the output of cane and sugar occur. An experiment laid out at the Agricultural Research Station, Taliparamba showed that

(1) there is a loss of at least 10 per cent in the weight of cane;
(2) the percentage of sucrose is appreciably reduced; and
(3) the glucose ratio is slightly increased (an undesirable quality) in diseased canes.

How the Disease Spreads.—The disease spreads

(1) through diseased setts and
(2) through the agency of a sucking insect.

Setts cut from diseased stools invariably produce diseased plants and it is through this agency that the disease has spread over almost the whole world. The insect agency is capable of carrying the disease over short distances by injecting the disease from an infected cane to a healthy one in the neighbourhood.

Control Measures.—The disease is incurable. It occurs under all conditions of soil, climate, cultivation and manuring. To secure the maximum success the following measures are recommended:—

(1) Setts for planting should be obtained from a locality where the disease is absent or they should be selected from disease-free stools. The selection should always be done before the leaves are cut. Any stool showing mosaic symptoms on the leaves should be discarded.

(2) After planting, the seedlings should be systematically and periodically examined, and in case any affected stools are noticed they should be immediately destroyed in order to prevent the spread of the disease through insects. The disease spreads rapidly from diseased to healthy canes during the period of active growth (the first five months). The spread of infection practically ceases after this period. Hence proper attention should be paid during the early stages of the crop. Whenever a field of cane is seriously infested with disease, the whole crop should be cut and milled and none of the canes used for seed. The field should then be cleared of all diseased material such as growing fragments of old stools and weeds. A rotation of crops should be practised to ensure security against re-infection. Under no circumstances should ratooning of diseased canes be allowed.

(3) The following varieties are highly susceptible to mosaic:— Co. 213, Poovan, Vellai, Red Mauritius, Java Hebbal and B 3412. Special care should be exercised in keeping the disease in check when these canes are grown.

Reports made by growers and others interested in cane cultivation to the Circle Officers of the Agricultural Department or to the Mycologist at Coimbatore will enable the Department to keep a close watch on the occurrence and spread of the disease.

S. SUNDARARAMAN,
Government Mycologist.

15. Unwanted Trees—How to destroy them cheaply and effectively.

Many people often feel the necessity of having a cheap and efficient method of destroying plants which grow in situations where they are not only not wanted but are also dangerous. In this presidency of ancient temples and other costly edifices one often finds with dismay that a little crack has set in, in the walls, the roof, the pillars, turrets, minarets or gopurams or in the linings of wells and a tiny plant is springing up which gradually grows lusty and strong and defies eradication. This eventually results in the cracks developing and the structure weakening or collapsing in time.

To prevent such loss as arises through the growth of plants on buildings, a preparation is available which kills unwanted plants in all stages of growth. It is hoped that authorities in charge of public buildings, owners of houses and interested cultivators will use this cheap preparation and save their property from avoidable losses.

This preparation is known as the "Atlas Tree Killer." It is sold in 1 pint and ½ pint tins at Rs. 2–2–0 and Re. 1–4–0 per tin and is available with Messrs. Peirce Leslie & Co., Ltd., Calicut, and their branches. It is a compound of arsenic and is highly poisonous and should therefore be kept in a place to which children and ignorant people have no access.

Directions for Use.

(1) Remove the bark all round with a portion of the wood in the form of a ring about 4 inches wide at not more than a foot from the ground.

(2) With a brush apply "Atlas" Tree Killer over the exposed part well. In the case of soft woods the solution can be diluted in the proportion of three parts water to 1 part "Atlas". Ringing close to the ground is necessary to ensure that the solution reaches the roots. The liquid gets into the tissues and passes into the root and other portions of the plant and is very quick in action. The plant dies out in the course of 3–7 days depending on the age. Trees with hard wood will take longer time.

S. SUNDARARAMAN,
Government Mycologist.

16. "Live-fence" (with Photographs).

The important item of work of an agriculturist after selecting a farm is to fence it to ward off against cattle trespass and pilfering thieves. For nearly a century, prickly-pear was the simplest and easiest fencing material for even the poorest ryot. It costs little or nothing and takes root easily in any kind of soil. But it has its own disadvantages. It intrudes into cultivated fields and provides a very good harbour for reptiles. Its destruction by the Cochineal insect must be considered a blessing in disguise. Very large areas of cultivable land which were covered by the prickly-pear have now been brought under the plough and are being cropped. The question of finding a suitable substitute has, however, become a rather serious problem especially in places where no other fencing material is available. Below is given a few of the fencing materials which can be used with advantage.

1. *Balsomodendron Berryii*—(1. Mullukiluvai)—(Figure 1 and 2).

This forms a good fencing material. There are two varieties of this—the thorny and the thornless. Both can be propagated from cut branches. The proper season for planting this is just before the commencement of rains. If this fence is cut and trimmed well it will give a neat appearance. The cut branches can be dried and used as fuel.

2. *Euphorbia Koyleana*—(Bontha Kalli)—(Figure 3).

It is a most conspicuous and characteristic plant that can grow in dry rocky hills and in saline soils. Its ascending fleshy branches are five angled and thorny.

3. *Euphorbia Antiquorum*—(Chadurakalli)—(Figure 4).

A small tree of the dry regions of India generally. It is often used as a hedge plant. In some parts of Eastern Bengal and Assam this tree is almost sacred and is supposed to protect the gardens around which it is planted.

The propagation of this plant is also done by cuttings with two or more nodes.

4. *Euphorbia Tirucalli*—The Milk Hedge—(Tirugukalli) (Figure 7).

This is a small tree with round stem and smooth cylindrical branches and is very useful as a hedge plant. The milky juice of the plant is acrid and is used as a purgative and counter irritant, especially in the treatment of animals. Cattle, fully aware of the acrid juice which is very painful to the eyes, will not attempt to break through a hedge of it. It is propagated by planting the cuttings just at the commencement of the rains.

5. *Agave Americana—Aloes*—(Kathalai)—(Figure 5).

This is commonly known as "*Rail Kathalai*". These plants form a fine hedge after sometime and little or no attention is required after planting. The leaves of this plant yield very good fibre which can be used with advantage for making ropes. The plants are propagated from suckers.

These are planted just at the commencement of the rains on shallow mounds of earth formed for this purpose.

6. *Agave Sisalana*—(Sisal Hemp)—(Figure 6).

This is shorter than the Mexicana and is propagated from suckers also. The suckers are planted close during the commencement of rainy weather on tops of mounds. It needs little or no attention after planting.

The fibre extracted from this plant is finer and stronger than that from Americana.

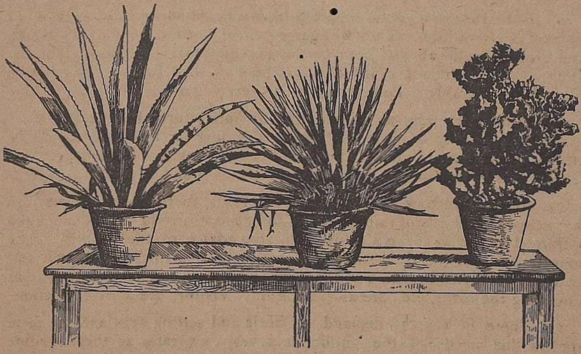
N. S. KULANDAISWAMI PILLAI,
Deputy Director of Agriculture,
V Circle, Trichinopoly.

17. Some Advantages of Poultry Keeping.

Eggs and poultry for meat are the primary edible products for those who use them in their daily diet. During recent years the demand for poultry products has considerably increased, especially in places near towns. In such places people take so keen an interest that they are becoming specialized in poultry keeping.

1 2 3 4

1. *Balsamodendron Berryii* (Mullikiluvai—Tamil) (thorny).
2. *Do.* (Do.) (Thornless).
3. *Euphorbia Royleana* (Bontha Kalli—Tamil).
4. *Euphorbia Antiquorum* (Chadura Kalli—Tamil).



5 6 7

5. *Agave Americana*—Aloes (Rail Kathalai—Tamil).
6. *Agave Sisalana*—Sisal Hemp (Usi Kathalai—Tamil).
7. *Euphorbia Tirucalli* (Tirugukalli—Tamil).

2. Some people keep fowls for hobby, some for the sport of cock fighting and some to realize profit out of them. The object of this short note is for those who want to keep fowls for profit. Fowls can be reared for home use also, and when there is a chance to realize a little profit from this branch of work there is no reason why greater attention should not be paid to it

3. The birds are docile and easy to manage; therefore one's wife or children can look after them whilst the men are employed in their fields.

4. Poultry keeping is within the scope of everybody and even a small farmer can keep a few fowls with advantage. People even in big cities and towns with some available space at their disposal can maintain a few birds. This system is generally termed as "backyard poultry keeping." With a little attention, good accommodation and proper feeding, this eventually becomes a source of a small income.

5. A good hen when fed and kept properly will eat about As. 5 worth of food in a month and will lay eggs worth about As. 11. So, by keeping thirty hens one can earn about a profit of Rs. 11 a month or Rs. 130 a year with a little trouble. Is not this income equal to the value of a crop?

6. It is distinct advantage to keep fowls in a small way in conjunction with general farming. The birds utilize enormous quantities of waste products, grains, and vegetables that are on the farm.

7. The birds can be put on the stubbles, i.e., a newly harvested field and the fowls will eat the shed grains which would otherwise go as a waste, thus converting all the waste material into edible product.

8. The birds eat the insect pests and grubs that may not be noticed by us in the fields and so they assist to eradicate the pests which might damage the succeeding crop.

9. In the case of a young crop the birds can be let into the fields when the crop is a foot high. They will get plenty of worms, insects, etc., which would otherwise do a lot of harm to the growing crop. By this system, the birds get an unlimited range and so the food bill for the birds can be reduced considerably. Poultry manure is very valuable.

10. Poultry keeping as a side line to Agriculture does really help a farmer in a variety of ways; so before deciding as how this should be started, consult the Deputy Director of Agriculture, Livestock, Hosur Cattle Farm P.O. who will give all necessary help and advice.

11. At the Livestock Research Station, Hosur, there is a poultry section which maintains birds of imported and indigenous breeds. It is managed by trained men who are in a position to give advice to the visitors. The natural and artificial methods of incubation, artificial feeding and rearing of chickens, breeding and feeding of breeding hens, different systems of housing the birds, etc., are all practised. Visitors are always welcome.

12. There is a great demand for birds and setting eggs and the farm supplies the needs of the public at a very low rate, as they become available. The breeds maintained are :—

(1) White Leghorns.
(2) Rhode Island Reds.
(3) Light Sussex.
(4) Black Minorcas.
(5) Chittagongs.
(6) Country birds.

The results for last year give the number of eggs laid in the pullet year by selected birds in each breed, as follows :—

Breed.	Number of hens.	Average egg yield in pullet year.	Highest individual yield.	Lowest individual yield.
White Leghorns ...	12	184	236	158
Rhode Island Reds.	9	157	181	135
Light Sussex ...	6	143	196	109
Black Minorcas ...	3	149	167	118
Chittagongs	3	134	149	116
Country (Tellicherry).	5	110	141	85

R. W. LITTLEWOOD,
Deputy Director of Agriculture, Livestock, and
H. NARAHARI RAO,
Poultry Assistant.

18. Natural Incubation of Poultry.

Natural Incubation.—The natural method of hatching, i.e., by the employment of broody hens is right and proper for those who intend keeping fowls in a small way, say up to 100 chicks.

Signs of Broodyness.—Broodyness is a maternal instinct in all female species of birds. It is an irresistable tendency to sit on the eggs until the chicks hatch out, which the nature has provided for reproducing the species. A country hen ordinarily lays 10 to 15 eggs in three or four batches and after each such lot, she goes broody. Broody hens can be recognized by:—

(1) Ceasing to lay eggs;
(2) A partiality towards a dark corner where she would like to make a nest and sit undisturbed;
(3) The feathers stand out when a person approaches it and the hen clucks;
(4) A general lack of appetite;
(5) A reduction in the size of the comb, wattles and the reproductive organs;
(6) A rise of temperature; and
(7) A general lack of lustre throughout the face.

The average time for a hen to incubate her eggs is twenty-one days although this period may either be lengthened or shortened by the influence of the temperature to which the eggs are subjected to. She can also be employed to incubate the eggs of other species of domestic fowls.

The following are the approximate periods of incubation of eggs for the different species of fowls :—

Hen	21 days.
Duck and Turkey	28 „
Goose	30 „

Sitting Hen.—Care should be exercised to see that the hen is properly broody before setting. Very often it so happens that, when a hen shows the signs of broodyness, the eggs are sett and the hen after a few days of sitting deserts the nest, which is a source of great disappointment, and loss.

To test that a hen is properly broody, one or two eggs or an artificial egg can be placed under her and tried for two or three days. If the hen settles to sit on the eggs properly, it can be taken for granted that the hen is properly broody.

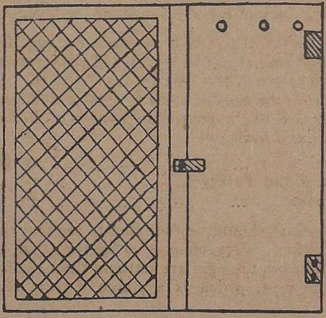
Selection of a Hen.—A medium-sized hen which is docile and in sound health should be selected; she must be perfectly clean with no lice or mites on her body; those with scaly legs should strictly be avoided for the reason that unless the hen is perfectly clean, she will pass on all the complaints to the chicks that she hatches. Some hens are clumsy, awkward and excitable and are apt to break the eggs every time they are let out and resettle. It is therefore necessary to watch the sitters carefully and if a hen proves unreliable, it will be a good thing not to use her for the purpose. Long legged hens are generally clumsy and the breakages of eggs are more, although some of them happen to be good mothers. Short legged variety of hens are more reliable and as such preference should be given to them.

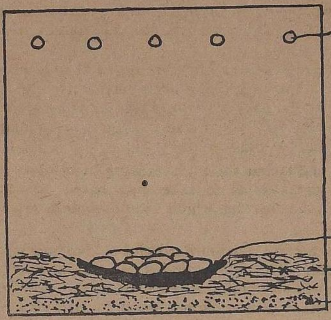
Number of Eggs to a Hen.—A good average size hen of imported strain can take from 10 to 12 eggs and a country hen 8 to 10 according to the size of eggs. Care should be taken to see that the hen is able to cover all the eggs properly. When the hen shuffles her eggs it is quite possible that one or two eggs might be left outside and consequently chilled. So it is always safe just to give her the number of eggs which she can conveniently cover and the others removed.

The number of eggs that a hen can sit on depends on the breed and size of the bird as follows :—

	Hen of imported breeds.	Country hens.
Hens' eggs	10 to 12	8 to 10
Ducks' eggs	7 to 8	6
Goose eggs	5 to 6	4 to 5
Turkeys' eggs	5 to 7	4 to 5

The Nest.—It is a simple matter to make the nest, but special attention is required. A dealwood case about 18 inches square with a trapdoor in front can be taken and the nest made out of hay or straw, over a layer of moist sand. On top of the hay or straw place some wood ashes; this helps to prevent lice, etc.





Coop for Sitting Hen.

It is necessary to put some ventilation holes on the side of the box to enable free circulation of air. During the process of incubation if dry weather is experienced a little water should be sprinkled all round the nest to increase the humidity and also on the sand at the bottom of the nest. The nest proper should be made circular with a slight hollow in the centre covered with a layer of wood ashes as mentioned before. It should not be too deep as there is the possibility of the eggs rolling to the centre and consequently some breakages amongst the eggs.

The box and the nest should be dusted with some disinfectant powder to keep off vermin. Powdered sulphur mixed with wood ashes, sodium floride and tobacco dust, answer the purpose very well. A good powder can be made from a cigarette tin-full of equal quantities of petrol and carbolic, pour this over 1 lb. of plaster of Paris and allow to dry.

The nest must be examined for vermin carefully once a week and action taken : if it is not attended to the hen becomes restless and does not sit properly and when the chicks are hatched out, they will be found to be covered with lice or fleas and so their growth suffers. The nest should be scrupulosly clean and should never be fouled. Any broken egg or droppings should be removed and any source of contamination should strictly be avoided. If however, the nest is fouled either by a broken egg or the hen's droppings, another clean nest can be made and the remaining eggs so contaminated should be washed in warm water about 100°F and the hen immediately returned to the nest.

Setting Eggs.—Fresh eggs of uniform good oval shape and size should be selected. Too small or abnormally big-sized ones should be rejected. The shell of the egg must be of sound texture, free from ridges and encrustations. While selecting eggs preference should be given to those laid by vigorous and well matured hens.

Storing and Holding Eggs.—When collecting eggs for setting they should be kept in a dry, cool, airy place. In plains they should not be kept too long. Under the best conditions, to get the best results, eggs should not be older than four to six days. In hill stations there is no harm in using eggs ten days old. As the eggs absorb odour very easily it is not good to store them near smelly substances like onions, kerosene oil, etc.

The Hen and its Treatment.—After having arranged the nest as described above, the nest box should be placed in a partially dark, quiet place, where there is no disturbance.

The hen should be sett preferably in the evening and should not be disturbed until the following evening. She must get plenty of grain food and drink before setting. From that day onwards she must be let out once a day at a stated regular time for feeding, exercise, etc. This guarantees the cooling and turning of eggs at regular intervals.

Dust-bath.—The fowls' natural method of cleansing themselves so as to be free from vermin and parasites is to take dust bath. So, the hen should be provided with a place for this which should contain sand mixed with wood ashes.

Feeding.—Sitting hens should be given hard grains like maize, wheat, cholam, cumbu, paddy, etc. The whole grains take a longer time for digestion and so the hen can sit comfortably on the eggs. Soft food like cooked rice and wet mash made of bran is not good for sitting hens. It is a bad practice to place either mash, grain or water in the nest itself for the hen to eat whilst sitting.

Good sitters generally do not come off the nest when required and so it will necessitate the removal of the hen by hand. While so doing it is quite possible that some eggs are concealed in her wings and dropped and consequently broken. This fact should be borne in mind while handling the bird. Usually good sitters go back to their nests after 15 to 20 minutes when they have finished their feed, drink, dust bath, etc.

This daily routine should continue with occasional dressing of disinfectant powder on the bird and the nest.

Testing of Eggs.—The eggs are tested on the tenth day of incubation. The simple method of doing is by means of a tube made out of a stiff paper, and holding each egg between the thumb and fore-finger and middle finger exposed to the sun light and examining it through the tube. All eggs that appear clear can be taken as infertiles and those that have spider-like structure inside with radiating lines are the blood vessels, and can be taken as "fertile" ones.

End of Incubation.—The nineteenth day evening will be the final day for the hen to be allowed out of her nest. On the twentieth day the hen sits tight and the chicks start their active life. They pip on one side of the shell with their beak-horn and break open the shell and struggle. The whole hatch finishes on the 21st day. It is not good to help the chicks to come out as such chicks will invariably be weaklings and hand assistance will cause injuries and damage.

Conclusion.—Another clean hen coop should be kept ready for transferring the newly hatched chicks with the mother hen. The hen can be given her food but the chicks should not be fed for at least 48 hours. The chick just before hatching takes in all the yolk material in the system and this serves as reserve food for a number of days. Such being the case, they should not be over-fed, as it is likely that they may get indigestion, diarrhoea, and in fact all sorts of complications. The first food for the chicks may be some finely broken grain, e.g., wheat, maize, cholam and broken rice. Oatmeal is the best food for young chicks. The mother hen will teach them to pick up grain and drink water and all we have to do is to house them properly and keep them free from lice, mites, etc.

The essential factors for a successful hatching are moisture, heat and air. When a hen goes broody, the normal temperature of her body increases due to the accelerated flow of the blood in the system. This heat aids towards the maintenance of the eggs at a temperature of about 103° to 104° F.

An egg when placed in its normal position, the impregnated or the fertilized germ comes topmost. The yolk which contains the germ is of less specific gravity than the albumen and so it floats on it. It is the object in nature's purpose to bring the fertilized germ topmost, as near to the source of heat as possible. When a hen is let out for daily exercise (generally this occupies 10 to 15 minutes per day) she returns to her nest afterwards. Before she settles down on the eggs she shuffles the egg by which the object of turning is accomplished. If the eggs remain in the same position, there is the possibility of the developing germ sticking to one side of the egg and consequent death of the embryonic chick.

It may be mentioned here that the incubators are made so as to subject the eggs almost to the same conditions as they would be under a hen during the process of incubation.

R. W. LITTLEWOOD,
Deputy Director of Agriculture, Livestock, and
H. NARAHARI RAO,
Poultry Assistant.

19. Brooding and rearing of Chicks.

The brooding and rearing of chicks is an important branch of poultry keeping, inasmuch as, it is the nucleus round which the whole enterprise has to be built. This may be classified as "Natural" and "Artificial." Towards achievement of success in this line one requires eternal vigilance, patience and attention to the smallest details.

Natural Brooding and Rearing.—In the above method man has taken advantage of nature's lessons and employed hens to brood and rear chicks provided they do not extend to an unwieldy number.

On being hatched out the baby chicks require, on first opening their eyes, to light, absolute rest as they have had enough exertion in their hard struggle to wriggle out of the eggs. They should not be let out till they become active enough, and show a tendency to leave the nest.

A clean coop should be prepared and kept ready to receive the newly hatched out chicks which have to be transferred with the mother hen. Whatever be the nature of these coops, the principles of cleanliness, freedom from damp and protection from extremes of weather conditions, should never be overlooked.

The mother hen should have free access to a dust bath which should have some disinfectant powder mixed in it to prevent lice, etc., getting on to the chickens which would worry them and reduce their condition resulting in their growth being stunted and consequently their turning out to be an economic failure.

The rearing capacity of a hen luckily exceeds her hatching capacity; taking advantage of this fact a good mother can be made to foster from 15 to 20 chicks including those hatched out about the same time, from other hens. She knows by instinct the principles of rearing chicks and so all that we have to do is to see to the importance of cleanliness, proper feeding and protection from enemies such as hawks, kites, rats, mongoose, snakes, etc. A small wire run will serve this purpose.

Inclemency of weather conditions affect the general health of the little chicks to a considerable extent, so the following precautions are the more important of those which should never be neglected in the selection of the place for the run :—

(1) adequate sunlight,

(2) prevention of humid surroundings, such as wet grass patches, floorings, etc.,

(3) cold winds and draughts.

Artificial Method of Rearing.—In intensive poultry farming, incubators have to be used to meet the large demand for chicks and recourse has to be taken to artificial brooding and rearing.

The natural way of rearing chicks has a distinct advantage, in that, it relieves us of a considerable portion of our responsibilities in attending to such details as the mother hen can do. When, however, the number becomes unwieldy, we have to necessarily depend on some mechanical contrivance that would successfully replace the mother hen providing the chicks all the comforts such as warmth, ventilation and space which she herself would have been in a position to give. "Foster Mothers," "Brooders" and "Hovers" serve the above purpose.

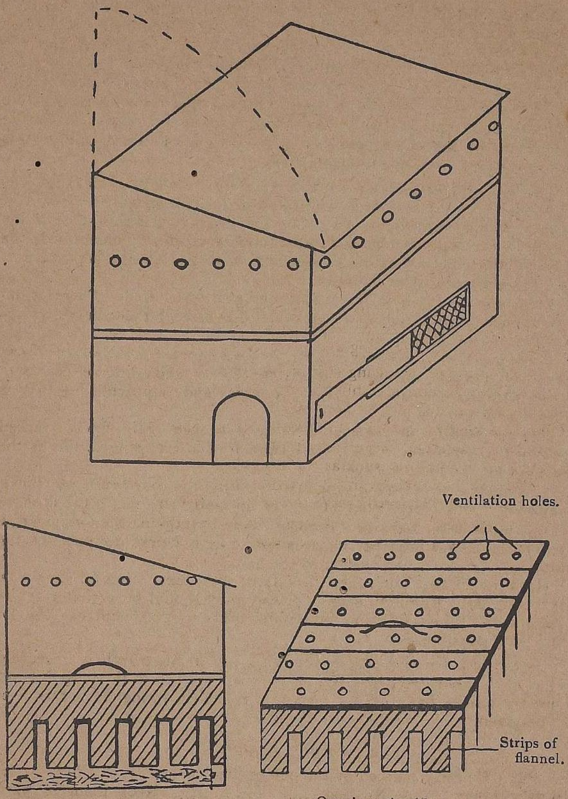
The "Foster mother" or "Brooder" is practically nothing else but a box in the chicken chamber which is heated by oil, coal or electricity, the temperature of which is adjusted by the flame in the case of oil.

The "Hover" is a cone-shaped piece of metal with a lamp in the middle, stands over the chicks like a canopy and the heat is radiated down below.

There are several types of Foster Mothers and Brooders in the market and this aspect of the question depends on the magnitude on which a farm is run.

For small farms, where 50 to 60 chicks are reared at a time "Fireless Brooders" can be easily made locally at a small cost. "Fireless Brooders" are those which have no lamp burning in them. The main principle is to conserve the heat generated by the chicks themselves.

Description of "Foster Mother."—For a unit of 35 chicks, take a packing case with the following dimensions 3′ long × 1′9″ broad and 1′ 6″ deep. The lid of the box should be shaped like a leanto roof. Just below the lid, ventilation holes should be provided in a row. Chicks generally crowd in the corners and so the four corners should be rounded off with a strip of wood. About 10 inches above the floor of the box, there is a cardboard roof on a wooden frame which fits on ridges and to which are suspended a number of flannel strips as per sketches—the openings alternating. The floor of the box should have some litter in the form of chopped dry grass, etc. The side of the box should have a ventilator 9″ × 3″ with a shutter which can be kept open or closed as necessity arises.



FOSTER MOTHER.

The number of chicks should be reduced as they grow older and in size. First week 35 to 40 chicks, second week 30, third week 25, fourth week 20 and so on.

In this kind of brooder, care has to be taken regarding floor space. Too many chicks must not be put into this, as they will be overcrowded and they will not thrive well and may start cannibalism.

This kind of Foster Mother is very good for the districts of this Presidency except Hill Stations.

Another kind of "Foster Mother" or "After-mother" as it is called is to get a box with a dimension of 4′ × 3′ × 2′. The inside of the box is lined with wire-netting and the space between the wire-netting and the side planks should be filled in with hay, straw or dry grass. As the chicks grow older the material can be thinned gradually till at last the whole lot of it is removed. The idea is to conserve as much warmth as possible during the early part of the chick's life and gradually lower the inside temperature as the chicks grow older. The chicks can remain in this "After-mother" from five to eight weeks.

Feeding.—Experience shows that mortality amongst chicks is the greatest between the first and the third weeks; so all endeavour should be made to push them through this period successfully. At this stage of life, apart from adequate warmth and other comforts already mentioned, the ration of the chicks must be so regulated as to give them a good start in life to develop into vigorous birds.

They must be given sufficient food but not be overfed. There is no harm in their feeling slightly hungry which would keep them busy scratching about in search of food.

There are a few principles in nutrition, which must be observed in any system of chicken rearing. Rations for chicks should have necessary nutrients to produce sufficient heat and energy and to provide all that is necessary for growth.

The first feed for chicks should be some broken grain finely cracked wheat or ragi or broken rice. If one can afford to get oatmeal, this is the best food for the first two weeks.

This should be fed on feeding boards within the easy reach of chicks. They should, however, be taught to pick up their first food in the absence of the mother hen; this can be easily done by tapping the forefinger on the board; thus attracting the attention of the chicks to pick up the grains.

Hard-boiled eggs finely grated, mixed with bread crumps, should be given twice daily up to two weeks. Clean water should be available before them always. Skim-milk and buttermilk are very good and can also be provided if possible.

Greenfood.—One important requirement for their growth is greenfood and as such this should be given when they are two to three weeks old. When the chicks have access for a free range on young grass, this need not be given.

Feeding Routine.

Age of chicks.	Feed.	Drink.
Up to 36 hours ...	No feed	Keep them in warm brooder.
Baby chicks up to 10 days.	Oatmeal or ground oats or finely cracked maize or wheat or broken rice depending on the availability of the grain locally. Five times a day: 6 a.m., 9 a.m., 11 a.m., 1 p.m. and 4 p.m. Feed sparingly and do not overfeed.	Clean water, skim-milk or buttermilk diluted with water.

Feeding Routine—cont.

Age of chicks.	Feed.	Drink.
10 to 20 days ...	Grainfood as noted above; at 11 a.m. boiled eggs finely grated with shell, with bread crumps. White ants to be collected and given to them.	Clean water, skim-milk or buttermilk diluted wtih water.
20 days to 1 month.	Grainfood as noted above but cracked a little bigger. Leaves of vegetables can be hung before them for picking. Fine shell grit and charcoal should be available before them always.	Do
4 to 6 weeks ...	Grainfoods as noted above—feed three times (bigger grain). Shell grit and charcoal as above.	Do.
6 weeks to 3½ months.	Mash: Stock Mash— 30 lb. wheatbran ... 30 lb. ricebran ... 30 lb. ragi flour ... 10 lb. groundnut cake. 10 lb. fishmeal... ... 3 lb. mineral mixture. 1 lb. salt ... ... Mix two parts of wheatbran to the above stock mash up to two months and one part up to 3½ months and any green vegetables to be chopped and mixed with wet mash. Cooked rice and beef on alternate days for chicken after one month. Shell grit and charcoal should be available before them always.	Do.

Drinking Water.—Add permanganate of potash to drinking water to give it a light red colour and change the water as often as possible; use an earthen vessel and keep it always in shade.

Give the chicks fresh ground each day in the sun.

Vices.—Lack of sufficient space, overcrowding, underfeeding, want of mineral matter, leaving about the weaklings which are not able to hold their own, large variations in size of the inmates, etc., are the factors which are responsible for toe-picking and cannibalism. Most of the above are easily prevented with a little attention and care. Sexes must be separated as soon as recognized.

Perching.—The chicks should be perched as soon as possible. They get better ventilation, fresh air all round them, than is obtainable when they are on the floor.

Conclusion.—In conclusion, it must be stated that there is no hard-and-fast rule with regard to these little things and that common sense and experience alone play the most important part in the enterprise in turning out to be a success.

R. W. LITTLEWOOD,
Deputy Director of Agriculture, Livestock, and
H. NARAHARI RAO,
Poultry Assistant.

20. Conditions to be fulfilled for the grant of Government Premium for Breeding Bulls maintained by Private Bodies.

1. The bull should be approved by the Director of Agriculture, Madras.

2. It should be fed properly and housed in a good sanitary shed and kept in good condition.

3. A service register with the following headings should be maintained:—

Date of service.	Name and address of the owner of the cow.	Amount of fee collected.	Description of the calf (male or female), colour of calf, etc.
		RS. A. P.	

4. **The bull should serve at least 40 to 80 cows in a year. In the case of young bulls (in the first season) the minimum number of services to qualify for the premium should be 25.**

5. The bull may be maintained by a single individual or a society.

6. The service fee may be fixed by the owner of the bull according to the locality and demand for the breeding bull.

7. The premium may be renewed year after year for three years for the same bull at the discretion of the officers of the Agricultural Department.

8. **An individual in one and the same place will not be allowed to keep more than one breeding bull.**

Care and Treatment of a Bull.—Considering that a bull is half the herd, he should be treated well and given more attention than the ordinary animals of the farm, that is, if he is to get strong, healthy, well-developed calves and give a good return for the money invested in him.

When a bull is taken to his new home, he generally refuses to eat much at first and so two or three weeks should be allowed before he is permitted to serve cows, etc., in order that he can get accustomed to his new surroundings and his feed.

Housing.—One of the first points in the successful management of a bull is to provide him with proper shelter from the heat in summer and from the rains and cold in the monsoon ; a shed about 10′ × 10′ well lighted and ventilated and free from draughts. A trough should be fitted. The best floor is concrete, Cuddapah slabs chipped (to prevent slipping) ; this is easily washed and kept clean. A good gravel floor is satisfactory but this cannot be washed. The shed should be thoroughly swept and cleaned out every day.

Feeding.—The bull should be kept in good condition if the maximum value from the bull is to be obtained and so he should be regularly fed with a fair amount of concentrated food. Suitable rations for bulls are as follows :—

Large Bulls doing lot of Services.

(1)
1 lb. cake.
2 lb. horsegram.
1 lb. cotton seed.
2 lb. ricebran.
15 lb. dry fodder
or
50 lb. green fodder.

(2)
2 lb. cake.
1 lb. horsegram.
1 lb. cotton seed.
2 lb. ricebran.
15 lb. dry fodder
or
50 lb. green fodder.

Medium-sized Bulls.

(3)
2 lb. cake.
1 lb. cotton seed.
3 lb. ricebran.
15 lb. dry fodder
or
50 lb. green fodder.

Medium-sized Bulls—cont.

(4)
2 lb. horsegram.
1 lb. cotton seed.
3 lb. ricebran.
15 lb. dry fodder
or
50 lb. green fodder.

(5)
2 lb. cake.
1 lb. cholam or sajja.
3 lb. ricebran.
15 lb. dry fodder.

(6)
1 lb. cake.
2 lb. horsegram.
3 lb. ricebran.
15 lb. dry fodder.

(7)
2 lb. cotton seed.
1 lb. horsegram.
1 lb. dholl husk.
2 lb. ricebran.
15 lb. dry fodder.

Feeds should be varied a little from time to time if the bull does not relish his food.

Half the concentrated food should be given in the morning and half in the evening ; a suitable time-table is as follows :—

6–30 a.m.	Clean out stall.
7 to 7–45 a.m.	Exercise bull.
7–45 a.m.	Water.
8 a.m.	Feed half-concentrated ration.
9 a.m.	Groom and clean bull.
11 a.m.	About 5 lb. dry fodder.

5 to 5-45 p.m.	... ...	Exercise.
5-45 p.m.	... ...	Water.
6 p.m.	... ...	Feed half-concentrated ration.
6-30 p.m.	... ...	Remainder of dry fodder 10 lb. or green fodder.

Cake should be soaked in water for 12 hours before feeding and horsegram should be boiled. A little jaggery can be mixed in the food two or three times per week.

Strict regularity in feeding both as regards quantity and time is one of the great secrets in the management of cattle.

Exercise.—Exercise is essential, otherwise the bull becomes slow and sluggish and shows no inclination to serve. Pay attention to the bull's feet, if the bull does not get enough exercise, the hoofs grow long and turn in and so the animal cannot walk properly. Keep the hoofs short and the soles flat by exercising in a hard road or by paring them with a short knife.

Grooming.—To keep the skin in proper condition and free from ticks, etc., the bull should be regularly brushed. Washing with soap and water is also beneficial occasionally.

If vermin appear, wash the bull two or three times with a solution of disinfectant such as cresol; give an interval of a week between each washing. The first washing should kill the active vermin but not their eggs; the second washing will destroy the vermin which hatch out of the eggs.

Service of Cows.—It is not advisable to run the bull with the cows. If this is done, the bull serves the cow repeatedly until both the cow and the bull are exhausted with the result that the cow may not prove in calf and the bull becomes unfruitful at an early age.

One service is sufficient if the cow is in proper season. Double service exhausts the bull to no purpose, endangers his fruitfulness, reduces his condition and constitution, diminishes the number of individual cows he can serve in one season and consequently the good he can do in the district.

PREMIA TOWARDS THE MAINTENANCE OF BULLS FOR BREEDING.

Instructions for the Working of Rules.

The bull will, in the first instance, be approved by an officer of the Livestock Section or the Deputy Director of Agriculture of the district. The bull should be available for inspection by any officer of the Agricultural Department. Before the premium is paid the Deputy Director of Agriculture or one of his assistants will inspect the bull and the service register and **if he is satisfied with the condition of the bull and the maintenance of the register he will recommend a grant of Rs. 100 (Rs. 50 towards care and management and Rs. 50 towards the number of services performed).** A smaller sum than Rs. 100 may also be recommended if the conditions are not fulfilled in full but the bull is maintained in good condition. The grant will be made at the end of the year after the inspection of the bull and would be renewable at discretion, year by year, for the same bull and on the same conditions **up to a maximum of three years.** The limit of three years is aimed at by the fact that every three to four years, the bull must be replaced in order to avoid in-breeding.

CONDITIONS ON WHICH BREEDING BULLS ARE LOANED TO DISTRICT BOARDS, MUNICIPALITIES OR OTHER LOCAL BODIES, CO-OPERATIVE SOCIETIES, PANCHAYATS, ETC.

(*a*) The bull is issued on loan.

(*b*) **The district board, municipality or the president of the co-operative society or panchayat will be responsible for the maintenance and housing of the bull.**

(*c*) The bull should be maintained in good condition and housed under a good roof and on a clean floor. The following food or its equivalent should be given daily in two feeds:—

2 lb. ricebran	or	2 lb. bran.
2 lb. crushed cotton seed	or	1 lb. cotton seed.
1 lb. soaked horsegram	or	2 lb. groundnut cake.
20 lb. cholam fodder or hay	or	20 lb. cholam straw.

(*d*) The bull will not be allowed to graze free with the cattle of the locality, but cows in heat will be brought to him and the bull will be allowed to serve cows in heat in a small enclosure, if possible.

(*e*) A small fee may be charged if the local body or society wishes to do so. If, however, services can be given free, Government have no objection.

(*f*) **The bull will not be allowed to serve more than 80 cows in a year, and every effort should be made to see that at least 50 services are performed.** The bull may be advertised by being shown at markets and fairs, if necessary, and if there is no disease in the district.

(*g*) The bull will be open to inspection by any officer of the Agricultural Department at any time.

(*h*) The local body or society will keep the Deputy Director of Agriculture, informed of the name and address of the person in whose charge the bull is placed and all changes of name or place will be notified.

(*i*) Should a bull become sick, the nearest Government veterinary institution should be informed without delay and its professional attention requested.

(*j*) The local body or society will pay all expenses on the transport of the bull from the farm to its destination and if the bull is not found suitable, it will be returned to the cattle farms or any other agricultural station in the district, if necessary, at their expense.

(*k*) The bull will be recalled if it is not well maintained and doing good work and the local body or society will be called upon to pay freight and expenses on its return.

(*l*) **Not more than one breeding bull will be issued to any public body for being maintained in one place.**

21. Training of Practical Cultivators, Maistris or Field Coolies.

It does not appear to be generally known that the Agricultural Department is prepared to take a limited number of practical cultivators, maistris or field coolies, for training in particular works or in the use of simple agricultural machinery on the different farms.

2. Experience has shown that the most effective method of demonstrating improvements to ryots is to carry out such work on their own land. The Department has done this to a considerable extent and will continue to do so; but a few men can, at the same time, be trained on the farms and it is possible that some landowners may wish to send selected labourers for such training.

3. Men will only be taken for such training (1) who are actually working on the land and have experience of farm work and (2) who are prepared to work alongside and with the farm coolies. Endeavour will be made to train as many applicants as are available and the probable number that can at present be satisfactorily trained is as follows :—

Anakapalle	6	Hosur	4
Coimbatore	4	Hagari	2
Samalkota	4	Nandyal	2
Palur	4	Guntūr	2
Kasaragod and Nileshwar	4	Taliparamba ...	2

Preference will be given to persons who have jobs awaiting for them at the completion of the training, that is to say, to persons who are sent to the Department by their employers to get special training. Whilst on the farm they must obey the Farm Manager and Assistant Farm Managers in charge of the farm and must work diligently and regularly. If they do not do so, the officer in charge will send them away even before their period of training is over. **They must pay their own travelling expenses and arrange for accommodation, but will receive wages for the work they do at the rates paid on the farm.** At the end of the training persons trained must be able to get appointment or jobs of their own accord and the Department will not find them employment. Persons trained must remember that their value in the labour market is increased by the training that they have had and they will possibly be found more eligible for employment than ordinary individuals.

4. **The Department is not prepared to give instruction generally in the management of oil-engines and motors.**

Particulars of the courses which can be given are subjoined :—

Station.	Practical work in which instruction can be given.	Approximate period of instruction.
Coimbatore ...	Ploughing—The use and adjustment of mouldboard ploughs.	One month—Cattle may also be sent to be trained.
	Drilling—The use of the seed drill.	One month—August 15th to September 15th.
	Jaggery boiling	One month—March-April.
	Paddy planting—Method of preparing, sowing and lifting seed-beds—Planting singly—Cultivation of green manure.	Two months—June and July.

(If women accompany their menfolk they can be trained in single planting and the use of winnowing machinery.)

Hagari ...	The use of heavy iron ploughs, black cotton soil ploughs, etc., in black cotton soils.	From March till August.
	The use of medium-sized ploughs in garden lands.	January to April.
	Pickling of jonna seed as a preventive against smut.	October.
	The use of Guntaka for removing the stubbles from dry lands and keeping dry lands clean.	June to September.
	The use of seed drills	September and October.
	Threshing of jonna earheads by stone roller.	February-March.
	Garden cultivation of ragi and onions.	June to February.
Nandyal ...	The use of black cotton soil ploughs (with bent shaft to avoid the animal walking in the furrows).	February to July.
	Pickling of jonna seed	September.
	The use of Guntaka for removing stubbles from dry land and keeping dry land clean.	May to July.
	The use of seed drills	August and September.
	Threshing of jonna earheads with stone roller.	January and February.
Guntūr ...	Ploughing—The use and adjustment of iron ploughs.	One month from June to September.
	Drilling—The use of seed drills.	Fortnight—July to October.
	Bullock hoeing—The working of junior hoe.	Fortnight—September to January.
	Preservation of cattle manure (box system).	One week at any time of the year.
	Working chaff-cutter	Do.
	Curing tobacco	One month—February to April.
	Clean picking of cotton ...	Fortnight—March to April.
	Pickling jonna seed as a preventive measure against smut.	At any time and until the method is understood.
	Chillies and tobacco—Method of preparing and sowing seedbeds.	Ten days—July and August.
Anakapalle ...	Implements—Adjustment and use of iron ploughs tested and approved by the Department.	For about a week, at any period of the year, preferably from December to July.

Station.	Practical work in which instruction can be given.	Approximate period of instruction.
Anakapalle —*cont.*	Mhote—Training of men and cattle for mhote work.	December to August, at any time for one week.
	Paddy—Method of preparing, sowing and lifting seed-beds and economic planting—Cultivation of green manure crops.	Three months—June 15th to September 15th.
	Seed selection	For about a week in December.
	Sugarcane—Preparation of land for planting, i.e., crow-barring or ploughing with iron ploughs, laying the field into ridges and furrows to economize water, and line planting.	Ten days at any time from 1st March to 1st April.
	Construction of Sindhewahe and Gōdāvari improved furnaces and preparation of white jaggery.	February to April.
	Propping and wrapping, trenching and application of oil-cakes.	For three months from 15th June to 15th September.
Samalkota ...	Paddy—Method of preparing, sowing and lifting seed-beds—Planting singles—Cultivation of green manure.	Three months—May, June and July.
	Sugarcane—Making jaggery—Row planting.	Two months—February to April.
Palur	Paddy seed selection	One week in August-September and one week in January-February.
	Sowing of green manure in wet lands.	One week in March-April and one week in May.
	Ploughing in of green manure and use of light mould board ploughs in wet lands.	One week in June and two weeks in July-August.
	Sowing of thin nurseri es ...	One week in May and ten days in July-August.
	Transplanting of single seedlings of paddy.	One week in June and a fortnight in September-October.
	Winnowing paddy with machine.	A fortnight in February.
	Drilling of dry cereals and their intercultivation with triangular harrow and dantulu.	One week each in June and July.

Station.	Practical work in which instruction can be given.	Approximate period of instruction.
Palur—*cont.* ...	Harvesting of cumbu stalks by reaper and threshing of cumbu earheads by stone roller.	Ten days in August-September.
	Threshing of ragi earheads by stone roller and winnowing by machine.	One week in March-April and one week in August-September.
	Preparation and trenching of lands for canes with iron plough.	About a week in February to March.
	Harvesting and milling of canes in power mill and boiling of jaggery in Sindhewahe furnaces.	A fortnight in March-April.
	Planting of sugarcane ...	Do.
	Intercultivation of sugarcane with junior hoe.	One week in each of the months May and June.
Kasaragod, Nileshwar and Pilicode stations.	Coconut cultivation	One year.
Hosur	Fodder growing and making hay and silage. Feeding and management of cattle. Breeds and types ... ... Veterinary elementary work ...	Do.
Taliparamba ...	Use of improved implements. Sowing of thin nursery ... Improved system of dry land cultivation. Growing of money crops such as chillies, ginger, etc.	May to October.
	Planting of pepper and standards. Bulk selection of paddy seeds.	Do.
	Planting and milling of sugarcane. Method of preparing jaggery...	December-January.

Applications for admission to Coimbatore should be addressed to the Principal, Agricultural College, Lawley Road Post Office; to Hagari and Nandyal, to the Deputy Director of Agriculture, III Circle, Bellary; to Anakapalle and Samalkota, to the Deputy Director of Agriculture, I Circle, Vizagapatam; to Guntur, to the Deputy Director of Agriculture, II Circle, Guntur; to Palur, to the Deputy Director of Agriculture, IV Circle, St. Thomas' Mount; to Hosur to the Deputy Director of Agriculture, Livestock, Hosur Cattle Farm; to Kasaragod and Nileshwar to the Oil Seed Specialist, Lawley Road, P.O. Coimbatore, and Taliparamba, to the Deputy Director of Agriculture, VII Circle, Tellicherry. These officers will furnish information about the time at which men can be taken and about possible accommodation if required.

22. State Loans and other Facilities.

The following important rules framed under the Land Improvement Loans Act of 1883 and the Agriculturists' Loans Act, 1884, are herein published for the benefit of ryots who may be unaware that such facilities exist :—

Rules.

I. Loans may be granted to owners and also to *occupiers* of land.

(*A*) *The Land Improvement Loans Act.*—For the construction of or repair of wells or tanks, the reclamation of waste or any other work which would permanently increase the letting value of lands.

(*B*) *The Agriculturists' Loans Act.*—For the purchase of seed grain, working cattle, breeding bulls, for the re-building of houses by cultivators in tracts newly occupied and cultivated, for the construction of cattle sheds and of houses destroyed by fire or flood and for other agricultural objects as purchase of fodder including cotton seeds both for domestic and agricultural cattle, and of manure, erection of sugarcane mills or furnaces, of contrivances for raising water and for the relief of distress (when recognized by Government) to enable owners and occupiers of land to subsist until the next harvest. **Loans are granted for planting any of the following fruit-bearing trees :—Coffee, coconut, mango, jack, orange, lime, cashewnuts, custard apple, guavas, pomegranate, figs and grapes.**

II. All Revenue Officers of and above the grade of Deputy Tahsildars are competent to sanction the above loans. Applications should be made to them.

III. Interest shall be charged at the rate of 6½ per cent per annum except on loans granted for the relief of distress which shall be charged interest at 3 per cent, the Collector having the discretion to remit the charges in case of borrowers who are known to be poor. The Local Government reserves the power to grant loans in special cases at special rates of interest or without interest.

(x) If the work started with the aid of the loans fails from cause beyond the borrowers' control, Revenue Divisional Officers, District Collectors and the Board have the power to remit the whole or any portion of the unpaid balance.

(xi) The Collector may advance as loans to the members of the village community or to a group of cultivators on their joint personal security an amount not exceeding five times the annual assessment of the lands registered in the names of the applicants for the purpose of improving tanks or embankments and such like in which they would be jointly interested.

(xxv) With a view to provide great facilities to borrowers, Collectors, Tahsildars and independent Deputy Tahsildars, have been authorized to make disbursement on the spot in villages during their tour.

(For detailed rules vide Takkavi Manual.)

2. Loans may also be granted by the Director of Agriculture for the purchase of implements as ploughs, tractors, guntakas, seed drills, sugarcane mills, etc. For detailed rules vide Special Loan Rules.

3. Similarly the Director of Industries may grant loans for the purchase of oil-engines and pumps. For detailed rules vide Special Loan Rules.

4. There is no objection to an individual to obtain several loans either simultaneously or at different times provided they are for distinct purposes

and covered by separate and independent security. There should be a separate application and a separate loan order in each case.

5. Owners and occupiers of land in need of above loans should apply to the nearest Agricultural Officer who will forward them to the officers concerned with a brief note explaining the bona fides of the applicants as well as the need and urgency of the loan.

Standing Order, Board of Revenue, Land Revenue and Settlement.

19-*B. Planting of Trees by Ryots on Poramboke Lands not available for Assignment under the Darkhast Rules.*

Ryots will be permitted, subject to their obtaining licences, to plant trees on poramboke lands, not being lands placed under the control of village panchayats established under Act XV of 1920, in order to meet their requirements in regard to timber, fuel and leaf-manure. These licences will be subject to the following conditions :—

(i) Planting will not be allowed on lands already containing valuable Government trees, as it might, in such circumstances, become difficult in the course of time to distinguish the trees belonging to Government from those planted by ryots.

(ii) The previous permission of the Tahsildar or Deputy Tahsildar should be obtained before trees are planted. In the case of porambokes in charge of the Public Works Department, however, such permission should not be granted without the previous consent of that department, which may impose such additional restrictions as it may consider necessary.

(iii) The boundaries of the land and the number and kind of trees to be planted should be specified in the licence.

(iv) The grant will confer no rights over the land.

(v) No fence shall be raised by the licensee, except for the separate protection of each young plant. In special cases, Collectors may allow the raising of a continuous fence for a definitely limited time. Prickly-pear should not be allowed to be used as fencing.

(vi) The Government will have the right to remove the trees, when necessary, without liability to grant any compensation; in this case, however, the trees will be sold in public auction and the proceeds paid to the licensee; or the timber will be made over to the licensee if he desires it.

(vii) The licence will be subject to cancellation if the trees are not planted within a reasonable time or if they are not looked after properly.

(viii) The licensee will enjoy the usufruct of the trees and the timber free of charge, except that licensees will have to take tree pattas for fruit-bearing trees of the kind usually taxed, as soon as they begin to bear fruit.

(ix) The previous permission of the Tahsildar or Deputy Tahsildar will be required before cutting a tree, but such permission will ordinarily be granted.

(x) These rules will be subject to suitable modification in each case on application from village panchayats.

2. A form of licence will be found in Appendix XII-A of Standing Orders of the Board of Revenue.

3. Please apply to the nearest Agricultural Officer. Permission will be obtained by him on behalf of agriculturists who are willing to avail of the above concession.

Fodder Concession.

The South Indian Railway authorities have agreed to allow the transport of fodder (hay and straw) pressed into bales from and to the stations in Coimbatore, Salem, Trichinopoly and Tanjore districts at a concessional rate of 0·3 pies per maund per mile.

Ryots who are willing to avail of this concession should apply to the nearest Agricultural Officer. Those who are willing to apply direct may do so to the Chief Commercial Superintendent, Trichinopoly.

Special Loan Rules.

1. Any owner or occupier of arable land desiring to obtain a loan for the purchase of agricultural machinery or plant and for carrying out any improvement to his land in connexion with the use of such machinery or plant should apply to the Director of Agriculture, Chepauk, Madras.

2. For the purposes of this rule the term "Agricultural machinery or plant" includes machinery or plant used for purely agricultural operations such as ploughing, harvesting and for such preparation of agricultural produce as cane-crushing.

3. The Director of Agriculture shall be competent to sanction loans up to Rs. 10,000 in each case.

4. The rate of interest charged on loans shall be 6½ per cent per annum.

5. The loans shall be repayable by fixed annual instalments in discharge of both the principal and interest.

6. The amount of instalments and the period within which the loan shall be repaid shall be fixed by the Director, who shall have regard to the probable durability of the improvement proposed to be effected with the loan, to the value or sufficiency of the security given, and to the convenience of the borrower and the circumstances of the case; but the period so fixed shall not exceed the maxima shown below :—

(i) when the loan is secured on landed property—20 years.
(ii) Do. machinery or plant—5 years.
(iii) Do. personal security—2 years.

7. If the Director is at any time satisfied that any person who has received a loan under these rules has failed to perform any of the conditions subject to which the loan was made, he may after recording his reasons in writing, pass an order directing recovery forthwith of the balances of the loan with any interest payable thereon and all costs as an arrear of land revenue and shall send a copy of such order to the Collector of the district within which the land is situated and the Collector will proceed to recover the same.

8. Please apply to the nearest Agricultural Officer for further particulars.

No water-rate or faslijasti for certain crops; concessions made by Government to ryots in aid of cultivation.

The advantages of growing such crops as sunnhemp, indigo, greengram, dhaincha, kolinji, etc., for fodder or for manure have often been alluded to in the Villagers' Calendar. The Department has published several leaflets on this subject. A list of them will be found at pages 173—178 of the Villagers' Calendar. Many cultivators are not aware of

the liberal concessions made by Government to encourage the practice of growing such crops. For their benefit, the following information is given :—

Green-manure crops are generally grown on wet lands and they are either ploughed into the land on which they are grown or cut off and used on other lands. The former method is generally preferable. In some places such crops are grown on dry lands and removed and used in wet lands in due course. These crops of course require moisture in the soil at the time of sowing and for some time after it. They should therefore be sown when there is sufficient moisture in them, immediately before or after the harvest on single crop wet land or before the transplantation of paddy or other wet crop. It may also become necessary to irrigate these crops direct for a short time.

Under the rules in force before, green-manure crops so raised were liable to be charged with water-rate or faslijasti. **But seeing the immense benefit accruing to the ryot from the use of these crops as green-manure, the Government have been pleased to direct that no charge for water-rate or faslijasti should be imposed on crops grown for manure in any circumstance. The ryot is free to sell his surplus crop to others if he cannot make use of it all himself.** If a green-manure crop is raised on wet land and the succeeding paddy crop becomes *savi*, then the ryot may claim remission. The green-manure crop will not be taken into account when deciding the question of grant of remission.

These concessions apply equally to fodder crops except that these will be charged like any other crop if they are sold to others or if a harvest of seed is taken from them.

Grass grown for pasture on wet lands may also be irrigated free of charge. Free water may also be used to soak the paddy stubble for manurial purposes and, when available, free water will be supplied for two years to wash out the salts from *soudu* lands and during the second-crop season to improve one-crop wet lands liable to *soudu*.

Full instructions may be obtained as to the crops most suitable for green manure purposes from the following officers :—

The Deputy Director of Agriculture, I Circle, Vizagapatam.
Do. do. II Circle, Guntūr.
Do. do. III Circle, Bellary.
Do. do. IV Circle, St. Thomas' Mount.
Do. do. V Circle, Trichinopoly.
Do. do. VI Circle, Madura.
Do. do. VII Circle, Tellicherry.
Do. do. VIII Circle, Lawley Road P.O., Coimbatore.

23. How to send Specimens for Examination.

Instructions for—

(1) Sending samples of soils and manure for analysis.
(2) Reporting insect damage.
(3) Forwarding specimens of diseased plants.
(4) Forwarding specimens for identification.

To be successful in the cultivation of crops one must give careful consideration to the various aspects of farming, such as, the preparation of

the soil, the application of manures, timely irrigation, the carrying out of seasonal operations and the protection of crops from insect pests and fungus diseases. A neglect of any one of these items forms a weak link in the chain and reduces the yield. It is, therefore, essential for a ryot to know first of all the nature of a soil, its deficiencies as regards plant food and the methods he should adopt to increase the outturn. Further there are various kinds of fertilizers in the market to choose from and for their judicious application, the cultivator ought to be able to decide which kind of manure and how much of it he might apply with benefit to his crops. For this purpose one may consult the agricultural chemist whose duty it is to carry on research relating to soil conditions and plant growth. If the farmer were to send a sample of his soil or manure he would get suitable advice from the chemist. **Instructions for sending samples of soils and manures for analyses are detailed below.**

All crops are subject to attack by insects and fungi. Some of the important insect pests are, for instance, the swarming caterpillar of cereals and the hairy caterpillar attacking various dry crops. These insects appear all on a sudden in enormous numbers, do serious damage to standing crops and then disappear. A cultivator ignorant of the nature of the life history of insects gets perplexed and feels helpless. Similarly he feels puzzled at the premature fall of arecanut and the smutting of grains in cholam ear-heads and at the sudden wilting and dying of healthy plants, even though the plants may have been manured and watered regularly. These diseases are caused by fungi (low forms of plant life) which rob the cultivated crops of their nutrients and act as parasites on them. The cultivators often realize the situation only after the damage had become serious. The old proverbs "Prevention is better than cure" and "A stitch in time saves nine" are aptly applicable in these instances for combating pests and diseases of crops. There are special officers (the Entomologist and the Mycologist) at the Agricultural Research Institute, Lawley Road P.O., Coimbatore, who are prepared to give the necessary advice and help when one sends specimens of insects doing damage and also of diseased plants. **Detailed instructions are noted in this leaflet.**

Agricultural demonstrators are now stationed in most of the taluk head-quarters who are specially qualified to demonstrate "Better farming methods" and who are competent to give the necessary advice and help on the spot in many cases. **As far as possible they should be consulted before applying for help to the Research Officers at Coimbatore.**

I. Sending samples of soils and manures for analysis.—Subject to the limitation of departmental work, the Agricultural Chemist at Coimbatore is prepared to undertake the examination of soils, manures, etc., sent by bona fide landowners and cultivators. The fees charged for such analysis are shown below:—

A. Soils.—The fertility of a soil depends on many factors and hence chemical analysis must be considered only as a partial guide in estimating its crop producing power. Provided, however, that the sample is collected in a proper manner and full particulars as indicated below are furnished with the sample, much useful advice as to the manurial or other requirement of the soil can often be given as the result of a chemical analysis.

It is essential that the sample of soil for analysis should be really representative of the whole plot or field and not be taken from one patch which may be particularly good or particularly bad. **The following method should therefore be adopted:** Collect several samples, say, about a dozen,

and mix these together. Any surface vegetation should be scraped off before the samples are taken. Dry the mixed soil in the air, taking 5 lb. of the sample, pack this securely in a cloth bag enclosed in gunny and send the sample to: The Agricultural Chemist, Lawley Road P.O., Coimbatore.

The name and address of the sender should be enclosed in the parcel. At the same time, send a letter to the Agricultural Chemist with the following information:—

1. Name and address of the person who sends the sample.
2. Locality—Village, Taluk and District—where the land is situated.
3. Survey number of the field.
4. Nature of the land, wet (single or double crop), dry or garden land.
5. Crop usually raised.
6. Facilities for irrigation.
7. Facilities for drainage.
8. Manurial history of the land.
9. What is particularly the defect in the land, as far as can be judged by the party himself.

If more than one sample is sent, great care should be taken that the samples are securely packed so that they may not become mixed up in transit.

B. Manures.—Send not less than 1 lb. of the manure securely packed. In the case of substances such as lime, the sample should be enclosed in an air-tight tin. The sample should be representative of the whole consignment. If the latter is a large one, samples should be collected from every tenth bag, these should be mixed well together and a final sample taken from the mixture for analysis. If the consignment is a small one only mix thoroughly the whole quantity before taking the sample.

Fees.—The scale of fees shown below will be charged for analysis. The United Planters' Association of South India will be allowed a discount of 10 per cent of the fees for collecting the same from its members.

One-fifth only of these fees will be charged for analysis carried out for bona fide ryots. Ryots wishing to take advantage of the reduced rates must apply to the Assistant Director of Agriculture or the Deputy Director of Agriculture of their circle for a certificate that they are entitled for the concession rate and this certificate should be forwarded to the Agricultural Chemist at the same time as the sample. If the fee for the analysis is not sent in advance, the report will be sent to the ryot by V.P.P.

A.—Soils.

	RS.
1. Complete chemical analysis including the available potash and phosphoric acid.	25
2. Mechanical analysis	5
3. Complete chemical and mechanical analysis	30
4. Alkaline soils (extra fee)	10

B.—Manures.

1. Poonacs (nitrogen)	5
2. Blood-meal (nitrogen)	5
3. Nitrate or calcium cyanamide (nitrogen)	5

		RS.
4.	Nitrate of soda (nitrogen)	5
5.	Nitrate of lime (nitrogen)	5
6.	Kainit (muriate of potash) or (sulphate of potash) (potash)	5
7.	Lime stone or slaked lime (lime and carbon dioxide) ...	5
8.	Fish (nitrogen and phosphoric acid)	10
9	Bonemeal (do. do.)	10
10.	Superphosphates and basic slag (total soluble phosphoric acid).	10
11.	Saltpetre (nitrogen and potash)	10
12.	Ashes (potash and lime)	10
13.	Mixture of poonac and bonemeal (nitrogen and phosphoric acid).	10
14.	Mixture of poonac and fish (nitrogen and phosphoric acid).	10
15.	Mixture of fish, poonac and sulphate of potash (nitrogen, potash and phosphoric acid).	15
16.	Mixed manures with four elements (nitrogen, potash, phosphoric acid and lime).	20
17.	Farmyard manure	15
18.	Green-manure	15
19.	Vegetable compost	15

C.—Feeding Stuffs and Fodders.

1.	Feeding stuffs and fodders (moisture, crude proteids, albuminoids, fat, crude fibre, and soluble carbohydrates).	30
2.	Feeding stuffs and fodders (manurial value—potash and phosphoric acid).	10 extra

D.—Miscellaneous.

1.	Oil seeds (oil only)	5
2.	Water (for irrigation purposes only)	10

II. Instructions for reporting insect damage and for forwarding insects for examination.—When insects are found attacking crops or garden plants and no means of stopping the damage which they are doing are known, the owner of the crops or plants should communicate with the Entomologist at once. Very often, the Entomologist cannot help a ryot to fight against insects on his crops because the appeal for help is sent in when it is too late for anything to be done. It often happens that insects are not noticed until the damage done by them is very great. In such cases, it is very rarely that any help can be given. Ryots should always be on the look out for insects likely to harm their crops. Some insect pests come every year at about the same time and can be prevented from doing much damage if the ryot is on the look out for them. Others, again, take the ryots by surprise, appearing in one year and not coming again for many years afterwards. Even in this case, if a report is sent to the Entomologist in time it may be possible to stop the damage which is being done and save the greater part of the crop.

When reporting the appearance of insect-pests, the following points should be remembered :—

(1) Report in time.

(2) Do not give description of the insects, but send whenever possible *living specimens.*

(3) Put inside the parcel a piece of paper containing the following information :—

(i) Name and address of sender.

(ii) Name of village or villages.
Name of nearest railway station.
Name of taluk or district where the insect occurs.

(iii) Crop or crops attacked.

(iv) Vernacular names of insects, if any.

(v) Date of first appearance of the insect-pest.

(vi) Local control measures used, if any.

(vii) Whether pest has appeared recently or is of annual occurrence.

(viii) Any other information likely to help the Entomologist.

(4) *Do not send by registered post.*

(5) *Do not address* parcels to the Entomologist *by his personal name.*

Living insects will, as a rule, travel well in a tin with small holes punched in the lid. Put some grass or moss inside the tin so that insects will not shake about, and always provide sufficient food to last them during the journey.

Insects boring in twigs, stems, branches, etc., should be sent, if possible, *in situ*, in the part of the plant in which they are living.

Dead insects can be sent in a bottle containing some arrack (spirits). Butterflies or moths can be sent in envelopes with their wings folded over their backs.

Cultivators must bear in mind that no remedial measures can be recommended on receiving a bare description of the insect or the damage which it does. Also it is most important to send reports in time. This warning is repeated as time and money have often been wasted by officers of the section visiting a spot from which a report of the insect damage has been received only to find on arrival that the damage complained of was done a month or two before. In such cases as this, the journey is only a waste of time and of public money. **The Entomologist is always willing to hear from cultivators about insect-pests, which are of common occurrence on their crops, and the time of the year when they are most active.** Information of this kind is very valuable and the Entomologist may be able to arrange a campaign to defeat the insects, if not at once, at any rate, the next time they appear. All parcels should be addressed to the Entomologist, Agricultural College and Research Institute, Lawley Road P.O., Coimbatore.

III. Instruction for forwarding specimens of plant diseases to the Mycologist.— The Mycologist at Coimbatore is always prepared to examine specimens of plant diseases received from the people interested in Agriculture and to give them advice regarding the control of plant diseases or the prevention of their recurrence. Examination is done and advice given free of all charges. Agriculturists from any part of the Presidency can thus utilize the services of the Plant Doctor provided they send him specimens of diseases occurring in their fields by post or in the case of heavy packages, by railway parcel.

When specimens are received from distant localities it frequently happens that they are covered over with moulds which make the diagnosis of the trouble difficult. **The following directions if carried out will help senders to ensure the arrival of their specimens in a fit condition for examination.**

A.—General.

1. Never address the packages by the name of the officer. Address all packages to the **Mycologist, Lawley Road Post, Coimbatore.** This helps the officer on duty to open and examine the contents even when the Mycologist is away from headquarters.

2. Specimens should never be packed damp. They should at least be partially dried. Specimens packed damp, often develop moulds in transit which interfere with the examination of the parasite.

3. As far as possible send specimens showing all stages in the growth of the fungus. The first appearance, the full attack and the final condition should be represented. This is best done by collecting a large supply of diseased material in the field and by picking out at leisure some of the best examples on each stage of the disease.

4. Plenty of material should be sent. This will facilitate free and thorough examination. Time is often wasted by calling in for better and larger supply of specimens and it sometimes happens that more specimens are not available when wanted.

5. When the name of attacked plant is not definitely known, specimens of its leaves and flowers pressed between sheets of blotting paper should be sent for identification.

6. Information on the following points should be given where possible :—

(1) Locality—district and village.
(2) Area affected.
(3) Vernacular name of the disease.
(4) Name of the plant affected.
(5) Extent of injury.
(6) Date of first appearance.
(7) Time of year when the disease is prevalent.
(8) History of previous occurrence.
(9) Conditions of climate, temperature, etc., which are said to favour or check the disease.
(10) Remedies used, if any.
(11) Methods of cultivation and manuring in vogue.

B.—Special.

1. *Whole Plants.*—When plants die out and the portion attaked is not apparent, whole plants should be sent. Small plants may be pressed whole. Larger ones such as sugarcane, can be dried in the sun, wrapped in gunny sacking and sent by rail. In the case of large plants, which cannot be sent whole, an attempt should be made to select those parts likely to have been affected.

2. *Branches and Roots.*—Partially dry them before packing. Disinfect the cut ends by painting tar or solignum. This prevents the entry of foreign organisms through exposed cuts.

3. *Leaves and Sheets.*—Press them between sheets of blotting paper, while, still fresh, to prevent them curling up on drying. The blotting paper should be changed each day for three or four days. When dry, a number of specimens can be packed into a small space between card-board sheets and sent by post.

4. *Fruits.*—Where possible, send specimens of (*a*) healthy fruits, (*b*) fruits beginning to show signs of disease, and (*c*) fruits in more advanced stages of decay, but not completely rotten. If the above are sent in one parcel they should be separately rolled in cotton wool and paper.

5. *Large Fungi.*—Large woody fungi such as growing on wood may be dried in the sun, rolled in tissue paper and packed in a box.

6. *Soft and Brittle Fungi.*—Soft and brittle fungi like mushrooms may be sent in spirits, whisky or arrack in a bottle securely sealed.

IV. The method of sending specimens to the Principal for identification.—1. Complete specimens having leaves, flowers and fruits enable the correct identification of a plant. Therefore, it is essential that in sending specimens care should be taken to select such samples only as have flowers and fruits. It is useless to send specimens without flowers as the knowledge of recognizing plants by leaves only has not advanced much.

2. The sample should not be more than 18 inches long and 12 inches broad. This sample should be placed over a sheet of blotting paper and the leaves spread out. Another sheet of blotting paper is placed over it and thus packed between thick card-boards. If there are more specimens than one this process can be repeated alternating the blotting paper with the plant specimens. Above all, two pieces of card-boards are placed, one on each side and the whole tied securely, packed and forwarded without delay as a parcel to the Principal, Agricultural College, Coimbatore.

3. The object aimed at is that the specimens should arrive at the Herbarium in as recognizable a condition and in as fresh a condition, as possible, as otherwise it may be impossible to recognize the plant. It is also for safe-guarding against attacks of mould and insect that this precaution of sending specimens packed between sheets of blotting paper is adopted.

4. In the case of grasses, sedges and small annuals, entire plants with the roots should always be sent.

5. Along with this specimen the following details, viz., the date of collection, the locality, the altitude, the nature of the plant whether herb, shrub or tree, the colour of the flower and any peculiarities observed on the spot when collecting should invariably be given in the letter of forwardal.

6. In the case of fleshy plants it would facilitate safe despatch if the specimen is first boiled partially and pressed as before after draining the extra water.

7. When sending seeds alone they must be first dried in the sun and later packed with few balls of naphthalene placed along with them, in a card-board or dealwood box. Whenever possible, leafy twigs of the plant producing those seeds should be sent.

8. In no case the specimens should be sent in the name of the officer as it would entail delay in forwarding replies.

24. Agricultural College.

What is the use of a College for teaching Agriculture? This question is frequently asked by farmers and landholders who know what a large amount of practical experience is required. They know how agricultural

knowledge, earned from generations of hard experience, is handed down from father to son and, thinking that an Agricultural College is intended to replace this with book knowledge, they may ridicule the idea and decide that their sons shall have none of it. On the other hand there are those who, knowing nothing of actual farming, and having great faith in education, think that a boy can be made into a practical farmer by reading books and attending lectures.

2. Both extreme views are wrong and the truth lies midway. Book-learning cannot replace practical experience, but the latter is not sufficient in itself: the proper teaching of agriculture must combine both. **An ordinary ryot knows a great deal, but his knowledge is to a large extent empirical, that is to say, he does not know the *reason why* for many of his facts and common practices.** There is no doubt that anything that is done with proper understanding and a knowledge of the *reason why* is better than if it is done by rule of thumb. A knowledge of the reasons underlying good farming practices is then an important part of what must be taught. In addition to this there is a good deal of special knowledge of great value to farmers, but which they cannot obtain in the ordinary way by experience; for instance, the value of chemical manures and how to use them, the nature and methods of control of plant diseases and insect pests, the use of oil-engines and pumps, etc.

3. Let us now see what the Agricultural College is and what it is doing. **The Agricultural College and Research Institute is situated about three miles to the west of Coimbatore town.** There are two main buildings, one intended solely for teaching purposes and the other is occupied by various scientific officers who are investigating agricultural problems, breeding improved varieties of crops, etc.

4. The College stands in the middle of a farm of about 500 acres. This includes black soils, red soils, of both dry and garden land, and paddy land irrigated from a tank. Thus the farm includes a great variety of conditions and there are crops of one sort or another on the ground at all times of the year. There is a dairy fitted with modern appliances attached to the farm and a herd of dairy cattle. There are blacksmith's and carpenter's shops, a good collection of agricultural machinery and many improved types of implements. In addition there is a veterinary hospital where animals from outside the farm are treated for all ordinary ailments.

5. It will be seen that the College is thoroughly equipped for teaching everything that a farmer should know. Students are told and shown how everything should be done and what is most important, *they do everything themselves*. A great deal of their time is spent in practical classes on the farm, in the dairy, cattle yards, veterinary hospital, workshops, etc. It is only in this way that they can understand everything thoroughly.

6. Besides the training of practical cultivators, maistries or field coolies referred to under section 21, page 113 of this Calendar three courses of training are available at the College—

(A.) Short courses in agriculture and
(B.) and (C.) the University courses.

7. Farmers who want their sons to help them in the better cultivation of their land and large landholders who intend their sons to take charge of the family property cannot do better than send them to the short courses in agriculture. The educational qualifications needed for the boys are

roughly of the S.S.L.C. standard. The subjects taught are (1) Farm Management, (2) Dairying, (3) Care of Animals, (4) Insect Pests and Diseases, (5) Malt making, (6) Manures, (7) Crop improvement, (8) Jaggery making, (9) Horticulture, (10) Vegetable Gardening including Horticulture. A start was made with Farm Management last year and other courses will be taken up in the course of this year. The aim is to train students mainly in the practical and business sides of the subjects. The tuition is at present free.

8. Students who have completely passed the Intermediate Examination in Science of the Madras, the Andhra or the Annamalai University are qualified to be admitted into the B.Sc. Ag., degree course which extends over a period of three years. This course provides for a thorough training in practical agriculture on scientific principles and the teaching of fundamental sciences allied to agriculture.

Each year 48 students are admitted. They come from all parts of the Presidency and they have to sit for the University Examinations at the end of each year and they have to pay a tuition fee amounting to Rs. 120 per year.

Five scholarships of the value of Rs. 20 per mensem are awarded annually as follows:—

(1) Two scholarships to students from the Muslim community;

(2) Three scholarships to students from the Depressed classes including backward classes.

9. Assistants in the Science sections and B.Sc. Ag., degree holders of particular proficiency can qualify themselves for the M.Sc., degree examination of the Madras University. They work under the guidance of Experts or Lecturers. Their number is very limited.

10. There are also openings in the Agricultural Department where appointments are open to students who have done well in the University Examinations.

ADMISSION.

The last date for the receipt of application from intending candidates for the short course in agriculture is 1st June and for the B.Sc. Ag., course 15th June. Prospectus and application forms may be obtained any time after 1st March. For this and further particulars application should be made to the Principal, Agricultural College and Research Institute, Coimbatore, Lawley Road, P.O.

25. Cultivation of Davanam and Maruvam.

Nursery.—The land is well dug with mammuties and all weeds and korai are completely removed. The beds are then levelled (well levelled) each bed being 3½ feet by 7 feet. The seeds which are very tiny, ½ to ¾ palam are soaked in water in cloth bags for 12 hours from evening 6 p.m. to morning 6 a.m. Then, the cloth bag is twisted and the water removed and also, the cloth bag is kept on ashes for sometime, to remove the moisture as far as possible. This seed is sown in one bed and immediately it is covered by sand and then with straw. The bed is watered by means of a rose can gently daily for 5 days, in the case of maruvam and three days in the case of davanam as maruvam germinates on the fifth day and davanam on the third day. After the germination the mulch is removed and watered daily by rose cans. It is so watered for 20 to 25 days when

the seedlings will be 6 inches high. Now the seedlings are ready for transplanting in the field.

Planting and after-cultivation.—The seedlings are gently pulled out and planted in the field which are heavily manured with Farm Yard Manure. Maruvam is planted in the beds 2 inches apart and davanam 1 inch apart. The seedlings from one bed of 3½ feet by 7 feet will plant 15 such beds. The crop has to be watered daily for 10 days till they establish themselves well. Pot watering is done, care being taken that the beds are not trampled and the seedlings spoiled. After 15 or 20 days, one good hoeing and weeding is done, when groundnut cake is applied at the rate of ½ to 1 lb. per bed. Pigs manure is applied only to Davanam and not to Maruvam. Then, watering every alternate day can be done either by pot waterings or any lift irrigation. A second weeding is done on the thirtieth day or thirty-fifth day. The crop can be cut on the fiftieth day after planting, first cutting fiftieth day, second cutting sixtieth day, third cutting seventy-fifth day. So the total life of the crop is only 90 to 95 days from November, December to March-April.

Harvest.—One bed 3½ feet by 7 feet will give for the first cutting Rs. 1–4–0 worth of produce, second cutting Rs. 1–12–0 worth of produce, third Re. 1–0–0 worth of produce.

The seed is sold at Re. 1–0–0 to Rs. 1–8–0 per palam and it should be carefully preserved in bottles.

II.—VETERINARY.

26. Veterinary Department—Its Purpose.

Just as the Agricultural Department exists for the assistance of the ryots in the improvement of the methods of cultivation, the Veterinary Department exists to help the ryots in the care, management and improvement of their livestock and the prevention and cure of their diseases. The working capital of a cultivator is mainly represented by his livestock and losses of his cattle from disease press hard on him. The annual number of deaths among cattle in this Province is considerable every year especially from contagious diseases. Apart from losses by death, extensive indirect losses also occur on account of a large number of cattle being temporarily incapacitated by disease. There are a number of diseases which affect cattle but the most severe of these cattle diseases are rinderpest, haemorrhagic septicaemia, and foot-and-mouth disease. The general prevalence of these diseases is one of the most serious obstacles in the improvement of cattle which is very essential for the development of Agriculture, and the function of this Department is to render assistance to the ryots in saving their cattle from the ravages of these diseases.

The Veterinary Department is equipped for this purpose, with a large staff of qualified Veterinary Surgeons who have been distributed throughout the Presidency according to the needs of each district. A good number of them are attached to Veterinary institutions permanently established in important places. Besides these three or more of these officers in each district are constantly touring in interior villages within specified localities with the necessary equipment, medicines and drugs to combat outbreaks of contagious cattle diseases and to provide treatment for ordinary ailments of animals.

A list of the several veterinary institutions in this Presidency where animals are treated both as in-patients and out-patients and also a list of the Touring Veterinary Assistant Surgeons with particulars of their head-quarters and jurisdiction appear elsewhere in this calendar. Ryots can always obtain veterinary aid and advice on all matters pertaining to their cattle from any of the officers mentioned in the abovementioned lists. Information and advice can also be obtained on application to any of the following officers according to the district to which the ryots belong:—

Ryots in	*Should write to*	
Madras	The Principal, Madras Veterinary College, Vepery, Madras.	
Ganjām and Vizagapatam districts.	The District Veterinary Officer,	Vizagapatam.
West Gōdāvari and East Gōdāvari districts.	Do.	Rajahmundry.
Kistna and Guntūr districts ...	Do.	Bezwada.
Nellore and Cuddapah districts ...	The District Veterinary Officer	Nellore.
Bellary and Kurnool districts ...	Do.	Bellary.
Anantapur and Chittoor districts ...	Do.	Madanapalle.
Chingleput and South Arcot districts.	Do.	Madras.
North Arcot and Salem districts ...	Do.	Vellore.
Coimbatore and the Nilgiri districts.	Do.	Coimbatore.
Malabar and South Kanara districts.	Do.	Calicut.
Trichinopoly and Tanjore districts.	Do.	Trichinopoly.
Madura, Ramnad and Tinnevelly districts.	Do.	Madura.

P. T. SAUNDERS.
Director of Veterinary Services, Madras.

27. Castration.

The operation of castration is performed on male animals in order to render them useless for breeding purposes and unable to beget their own kind. **This is a very important consideration for a breeder who wishes to improve his livestock, as it is only by the use of selected sires and the judicious mating of male and female that he can hope to obtain good results. Castration is also important in the case of those animals used for work, such as cattle and horses, for it renders them more tractable and makes it possible for them to be placed in company with females and other males of the same species both at work and at rest.**

In the case of sheep the wool produced by the castrated male is considered to be of a finer quality and thus commands a better price.

Castration consists in the removal of the animal's testicles or operation on the spermatic cord in such a way as to make the testicles sterile. There are several methods of performing this operation, and one which is still in vogue in many parts of this country is popularly known as " Mulling." This consists in the destruction without removal of either the testicles or the spermatic cord or both by hammering them between two stones or other hard objects until they are reduced to a pulp. The operation usually takes about half an hour, the animal the whole time suffering the most excruciating pain. In former years there was some excuse for " Mulling" animals, but now that Government have stationed in each district in this Presidency with Veterinary Assistant Surgeons who, in addition to their other capabilities, have been trained to perform the scientific operation of castration, it is time that enlightened inhabitants refused to allow their animals to be " mulled."

Veterinary Assistant Surgeons have been trained to perform the operation of castration by several methods, one of which consists in removing the testicles by a surgical operation, and this is the method usually adopted in the case of horses. **In the case of cattle, however, the operation can now be performed in a bloodless manner, the testicles not being removed.** The operator uses a large instrument known as **Burdizzo's Emasculator,** and with this he crushes the spermatic cord. This instrument, which resembles a large pair of pincers, is made in such a way that great pressure is exerted at the jaws by the application of a comparatively small force at the handles. The edges of the jaws come together so intimately when the instrument is closed that any tissue interposed between them is completely crushed. Each cord is crushed for a minute, which is sufficient to cause atrophy of the testicles and sterility of the animal. No after-treatment is necessary. The testicles and scrotum are swollen for a day or two after the operation, but the animal exhibits no systemic disturbance or any inconvenience whatever and may be sent back to the herd immediately or worked after a few days.

The chief advantages of the Burdizzo method of castration over mulling may be briefly enumerated as follows :—

(*a*) Mulling takes half an hour to perform, while the Burdizzo method of castration takes a couple of minutes.

(*b*) The after-effects are practically nil with the exception of a little swelling which disappears in a day or two, whereas the after-effects of mulling will often last for weeks and an abscess frequently forms at the seat of operation which may take a long time to heal.

The amount of pain caused to the animal by mulling must be extreme, and those who have seen this barbarous operation performed will realize this, whereas the amount of pain caused by Burdizzo's emasculator is very small.

As the operation takes such a very short time, it is not usual to give an anæsthetic to an animal about to undergo castration, but should the owner so desire, this can be done by the Veterinary Assistant Surgeon, and the animal will then be rendered absolutely insensible to pain.

The operation can be done at any age.

It is hoped that this new method will appeal to all owners wishing to have their animals castrated and in order to obtain the services of a Veterinary Assistant Surgeon for the purpose, intimation should be sent to his headquarter or to the nearest veterinary hospital or to the Tahsildar of the taluk concerned.

28. List of Veterinary Hospitals and Dispensaries, Cost of Treatment, etc.

Hospitals.

Serial number.	District.	Location.	Cost of treatment.	Maintained by
1	Ganjām ...	Berhampur ...	Fees levied... ...	Government.
2	Vizagapatam ...	Vizagapatam ...	Do.	Do.
3	Do. ...	Bobbili	Free...	Do.
4	Do. ...	Vizianagram ...	Do....	Vizianagram Samastanam.
5	East Gōdāvari.	Amalapuram ...	Fees levied... ...	Government.
6	Do.	Cocanada ...	Do.	Do.
7	Do.	Rajahmundry ...	Do.	Do.
8	Do.	Pithapuram ...	Free	Raja of Pittapuram.
9	West Gōdāvari.	Ellore	Fees levied	Government.
10	Kistna	Nil.	......	......
11	Guntūr ...	Guntūr	Fees levied... ...	Government.
12	Do. ...	Ongole	Free...	Do.
13	Nellore ...	Nellore	Fees levied... ...	Do.
14	Cuddapah ...	Nil.	......	......
15	Bellary ...	Bellary	Free...	Government.
16	Do. ...	Adoni	Do....	Do.
17	Kurnool ...	Kurnool	Do....	Do.
18	Do. ...	Nandyal	Do....	Do.
19	Chittoor ...	Chittoor ...	Do.	Do.
20	Do. ...	Madanapalle ...	Fees levied... ...	Do.
21	Anantapur ...	Hindupur ...	Free...	Do.
22	North Arcot ...	Vellore	Fees levied... ...	Do.
23	Do. ...	Tiruvannamalai...	Free	Do.
24	Salem	Salem	Fees levied... ...	Do.
25	Chingleput ...	Saidapet... ...	Do.	Do.
26	South Arcot ...	Cuddalore ...	Do.	Do.
27	Tanjore ...	Tanjore	Do.	Do.
28	Do. ...	Kumbakōnam ...	Do.	Do.
29	Do. ...	Negapatam ...	Do.	Do.
30	Trichinopoly ...	Trichinopoly ...	Do.	Do.
31	Madura ...	Madura (Tallakulam).	Do.	Do.
32	Ramnad ...	Rajapalaiyam ...	Do.	Do.
33	Tinnevelly ...	Tinnevelly ...	Do.	Do.
34	Coimbatore ...	Coimbatore ...	Do.	Do.
35	Do. ...	Erode	Do.	Do.
36	Do. ...	Tiruppur... ...	Fees to be levied from 1st June 1934.	Do.
37	The Nilgiris ...	Ootacamund ...	Fees levied... ...	Do.
38	Do. ...	Coonoor... ...	Do.	Do.
39	Malabar ...	Calicut	Do.	Do.
40	Do. ...	Palghat	Do.	Do.
41	South Kanara ..	Mangalore ...	Do.	Do.

Dispensaries.

1	Ganjām ...	Chicacole ...	Free	Government.
2	Do. ...	Russellkonda ...	Do.	Do.
3	Do. ...	Tekkali	Do.	Do.
4	Vizagapatam ...	Parvatipuram ...	Do.	Do.
5	Do. ...	Anakapalle ...	Do.	Do.
6	Do. ...	Jeypore	Do.	Do.
7	East Gōdāvari.	Polavaram ...	Do.	Do.
8	Do.	Kottapetta ...	Do.	Do.
9	Do.	Draksharama ...	Do.	Do.
10	Do.	Bhadrāchalam ...	Do.	Do.

Dispensaries—*cont.*

Serial number.	District.	Location.	Cost of treatment.	Maintained by
11	East Gōdāvari.	Peddapuram ...	Free	Government.
12	Do.	Razole	Do.	Do.
13	West Gōdāvari.	Palacole	Do.	Do.
14	Do.	Tanuku	Do.	Do.
15	Kistna	Masulipatam ...	Do.	Do.
16	Do.	Bezwada	Fees levied... ...	Do.
17	Do.	Gudivada ...	Free	Do.
18	Do.	Nuzvid	Do.	Do.
19	Do.	Jaggayyapeta ...	Do.	Do.
20	Do.	Kaikalur	Do.	Do.
21	Do.	Uyyur	Do.	Do.
22	Guntūr ...	Gurzala	Do.	Do.
23	Do. ...	Narasaraopet ...	Do.	Do.
24	Do. ...	Tenali	Do.	Do.
25	Nellore ...	Kavali	Do.	Do.
26	Do. ...	Venkatagiri ...	Do.	Do.
27	Cuddapah ...	Cuddapah ...	Do.	Do.
28	Do. ...	Badvel	Do.	Do.
29	Do. ...	Proddatur ...	Do.	Do.
30	Do. ...	Rajampet ...	Do.	Do.
31	Bellary ...	Hospet	Do.	Do.
32	Do. ...	Harpanahalli ...	Do.	Do.
33	Kurnool ...	Koilkuntla ...	Do.	Do.
34	Do. ...	Nandikotkur ...	Do.	Do.
35	Chittoor ...	......	......	...
36	Anantapur ...	Anantapur ...	Free	Government.
37	Anantapur ...	Tadpatri	Do.	Do.
38	North Arcot ...	Ranipet	Do.	Do.
39	Salem	Namakkal ...	Do.	Do.
40	Do.	Tiruchengode ...	Do.	Do
41	Do.	Krishnagiri ...	Do.	Do.
42	Chingleput ...	Chingleput ...	Do.	Do.
43	Do. ...	Tiruvallur ...	Do.	Do.
44	Do. ...	Conjeeveram ...	Fees levied... ...	Do.
45	Do. ...	Peravallur ...	Free	Do.
46	South Arcot ...	Kallakurchi ...	Do.	Do.
47	Do. ...	Chidambaram ...	Do.	Do.
48	Do. ...	Tindivanam ...	Do.	Do.
49	Tanjore ...	Tiruvarur ...	Do.	Do.
50	Do. ...	Mayavaram ...	Do.	Do.
51	Do. ...	Nannilam ...	Do.	Do.
52	Do. ...	Mannargudi ...	Do.	Do.
53	Trichinopoly ...	Ariyalur ...	Do.	Do.
54	Do. ...	Karur	Do.	Do.
55	Do. ...	Lalgudi	Do.	Do.
56	Madura ...	Madura City ...	Do.	Do.
57	Do. ...	Dindigul ...	Do.	Do.
58	Do. ...	Kodaikanal ...	Do.	Do.
59	Do. ...	Periyakulam ...	Do.	Do.
60	Ramnad ...	Ramnad	Do.	Do.
61	Do. ...	Devakottai ...	Do.	Do.
62	Do. ...	Virudhunagar ...	Do.	Do.
63	Do. ...	Srivilliputtur ...	Do.	Do.
64	Tinnevelly ...	Tuticorin ...	Fees to be levied from 1st June 1934	Do.
65	Coimbatore ...	Dharapuram ...	Do.	Do.
66	Do. ...	Gobichettipalaiyam.	Do.	Do.
67	Do. ...	Pollachi	Do.	Do.
68	Do. ...	Nathakadayur ...	Free	Do.
69	Do. ...	Kollegal ...	Do.	Do.
70	Malabar ...	Cannanore ...	Do.	Do.
71	Do. ...	Tellicherry ...	Do.	Do.
72	South Kanara...	Puttur	Do.	Do.

29. List of Veterinary Assistant Surgeons employed on Touring Work with their Headquarters and Jurisdiction.

UNDER THE DISTRICT VETERINARY OFFICER, VIZAGAPATAM.

Ganjam.

Designation and headquarters.	Jurisdiction.
(1) Touring Veterinary Assistant Surgeon, Berhampur.	Berhampur and Ichchapur taluks.
(2) Touring Veterinary Assistant Surgeon, Tekkali.	Tekkali and Parlakimedi taluks and Narasannapeta Revenue division.
(3) Touring Veterinary Assistant Surgeon, Aska.	Aska, Surada and Gumsur taluks.
(4) Touring Veterinary Assistant Surgeon, Russellkonda (Agency) division.	Gumsur-Udayagiri, Ramagiri-Udayagiri and Balliguda taluks.
(5) Touring Veterinary Assistant Surgeon, Chatrapur.	Chatrapur and Kudala taluks.
(6) Veterinary Assistant Surgeon in charge, Veterinary Dispensary, Chicacole.	Chicacole Revenue firka.
(7) Touring Veterinary Assistant Surgeon, Narasapatam.	Golgonda, Viravalli, Sarvasiddhi and Gudem taluks.
(8) Touring Veterinary Assistant Surgeon, Vizagapatam.	Vizagapatam and Anakapalle taluks.
(9) Touring Veterinary Assistant Surgeon, Vizianagram.	Vizianagram and Srungavarapukota taluks.
(10) Touring Veterinary Assistant Surgeon, Bobbili.	Bobbili, Salur and Parvatipur (only plains taluks).
(11) Touring Veterinary Assistant Surgeon, Gunupur.	Gunupur, Rayaghada and Bissemcuttack and Agency parts of Salur, Parvatipur and Bobbili taluks.
(12) Touring Veterinary Assistant Surgeon, Palkonda.	Palkonda and Chipurupalle taluks.
(13) Touring Veterinary Assistant Surgeon, Koraput.	Koraput, Pottanghi, Padwa, Malkanagiri, Nowrangapur and Jeypore taluks.

UNDER THE DISTRICT VETERINARY OFFICER, RAJAHMUNDRY.

East Godavari.

(1) Touring Veterinary Assistant Surgeon, Rajahmundry.	Rajahmundry and Ramachandrapuram taluks.
(2) Touring Veterinary Assistant Surgeon, Cocanada.	Cocanada taluk and Pithapuram sub-taluk.
(3) Touring Veterinary Assistant Surgeon, Peddāpuram.	Peddapuram taluk and Tuni sub-taluk.
(4) Touring Veterinary Assistant Surgeon, Amalāpuram.	Amalāpuram and Razole taluks.
(5) Touring Veterinary Assistant Surgeon, Polavaram.	Polavaram, Chodavaram and Yellavaram sub-taluks.
(6) Touring Veterinary Assistant Surgeon, Bhadrachalam.	Bhadrachalam and Nugur taluks.

West Godavari.

Designation and headquarters.	Jurisdiction.
(7) Tour ng Veterinary Assistant Surgeon, Bhīmavaram.	Bhīmavaram, Narasapur and Tanuku taluks.
(8) Touring Veterinary Assistant Surgeon, Ellore.	Ellore, Tadepalligudem and Kovvur taluks and Chintalapudi sub-taluk.

UNDER THE DISTRICT VETERINARY OFFICER, BEZWADA.

Kistna.

(1) Touring Veterinary Assistant Surgeon, Bandar.	Bandar and Divi taluks.
(2) Touring Veterinary Assistant Surgeon, Bezwada.	Bezwada and Gudivada taluks.
(3) Touring Veterinary Assistant Surgeon, Nuzvid.	Nuzvid division and Gannavaram.
(4) Touring Veterinary Assistant Surgeon, Jaggayyapet.	Nandigama taluk.
(5) Touring Veterinary Assistant Surgeon, Tiruvur.	Tiruvur division.
(6) Veterinary Assistant Surgeon in charge, Veterinary Dispensary, Kaikalur.	Kaikalur taluk.

Guntur.

(7) Touring Veterinary Assistant Surgeon, Guntūr.	Guntūr and Sattenapalle taluks.
(8) Touring Veterinary Assistant Surgeon, Bapatla.	Ongole and Bapatla taluks except Ponnur sub-taluk.
(9) Touring Veterinary Assistant Surgeon, Vinukonda.	Vinukonda, Narasaraopet and Palnad taluks.
(10) Touring Veterinary Assistant Surgeon, Nidubrolu.	Tenali, Repalli and sub-taluk Ponnur.

UNDER THE DISTRICT VETERINARY OFFICER, BELLARY.

Bellary.

(1) Touring Veterinary Assistant Surgeon, Bellary.	Bellary, Rayadrug and Siruguppa taluks.
(2) Touring Veterinary Assistant Surgeon, Adoni.	Adoni and Alur taluks and Yemmiganur sub-taluk.
(3) Touring Veterinary Assistant Surgeon, Hospet.	Hospet and Kudligi taluks.
(4) Touring Veterinary Assistant Surgeon, Hadagalli.	Hadagalli and Harpanahalli taluks.

Kurnool.

(5) Touring Veterinary Assistant Surgeon, Kurnool.	Kurnool and Nandikotkur taluks
(6) Touring Veterinary Assistant Surgeon, Nandyal.	Nandyal, Koilkuntla and Sirvel taluks.

Kurnool—*cont.*

Designation and headquarters.	Jurisdiction.
(7) Touring Veterinary Assistant Surgeon, Dhone.	Dhone and Pattikonda taluks.
(8) Touring Veterinary Assistant Surgeon, Markapur.	Markapur taluk.
(9) Touring Veterinary Assistant Surgeon, Giddalore.	Cumbum taluk.

UNDER THE DISTRICT VETERINARY OFFICER, NELLORE.

Nellore.

(1) Touring Veterinary Assistant Surgeon, Nellore.	Nellore and Rapur taluks.
(2) Touring Veterinary Assistant Surgeon, Gudur.	Gudur, Venkatagiri and Sulurpet taluks.
(3) Touring Veterinary Assistant Surgeon, Buchireddipalaiyam.	Kovur and Atmakur taluks.
(4) Touring Veterinary Assistant Surgeon, Kandukur.	Kandukur taluk.
(5) Touring Veterinary Assistant Surgeon, Kanigiri.	Kanigiri, Podili and Darsi taluks.
(6) Touring Veterinary Assistant Surgeon, Udayagiri.	Udayagiri taluk.
(7) Veterinary Assistant Surgeon in charge, Veterinary Dispensary, Kavali.	Kavali taluk.

Cuddapah.

(8) Touring Veterinary Assistant Surgeon, Badvel.	Badvel taluk.
(9) Touring Veterinary Assistant Surgeon, Proddatur.	Proddatur taluk.
(10) Touring Veterinary Assistant Surgeon, Rajampet.	Rajampet taluk.
(11) Touring Veterinary Assistant Surgeon, Cuddapah.	Cuddapah and Siddhout taluks.
(12) Touring Veterinary Assistant Surgeon, Rayachoti.	Rayachoti and Pulivendla taluks.
(13) Touring Veterinary Assistant Surgeon, Jammalamadugu.	Jammalamadugu and Kamalapuram taluks.

UNDER THE DISTRICT VETERINARY OFFICER, MADANAPALLE.

Chittoor.

(1) Touring Veterinary Assistant Surgeon, Madanapalle.	Madanapalle and Vayalpad taluks and Punganur sub-taluk.
(2) Touring Veterinary Assistant Surgeon, Chittoor.	Chittoor taluk.
(3) Touring Veterinary Assistant Surgeon, Tirupati.	Chandragiri, Kalahasti, Tiruttani and Puttur taluks.

Anantapur.

Designation and headquarters.	Jurisdiction.
(4) Touring Veterinary Assistant Surgeon, Anantapur.	Anantapur and Kalyandrug taluks.
(5) Touring Veterinary Assistant Surgeon, Gooty.	Gooty and Tadpatri taluks.
(6) Touring Veterinary Assistant Surgeon, Dharmavaram.	Dharmavaram and Kadiri taluks.
(7) Touring Veterinary Assistant Surgeon, Penukonda.	Penukonda, Hindupur and Madakasira taluks.

UNDER THE DISTRICT VETERINARY OFFICER, MADRAS.

Chingleput.

(1) Second Veterinary Assistant Surgeon, Saidapet.	Saidapet taluk (except Villivakkam and Madavaram firkas).
(2) Touring Veterinary Assistant Surgeon, Ponneri.	Ponneri and Tiruvallur taluks.
(3) Touring Veterinary Assistant Surgeon, Chingleput.	Chingleput and Madurantakam taluks.
(4) Touring Veterinary Assistant Surgeon, Sriperumbudur.	Conjeeveram and Sriperumbudur taluks.
(5) Veterinary Assistant Surgeon in charge, Veterinary Dispensary, Peravallur.	Madavaram and Villivakkam firkas of Saidapet taluk.

South Arcot.

(6) Touring Veterinary Assistant Surgeon, Tindivanam.	Villupuram, Tindivanam and Gingee taluks.
(7) Touring Veterinary Assistant Surgeon, Cuddalore.	Cuddalore, Chidambaram and Vriddhachalam taluks (only villages above six miles radius from Chidambaram).
(8) Touring Veterinary Assistant Surgeon, Tirukkoyilur.	Tirukkoyilur and Kallakurchi taluks.
(9) Touring Veterinary Assistant Surgeon, Chidambaram.	Chidambaram taluk within a radius of six miles.

UNDER THE DISTRICT VETERINARY OFFICER, VELLORE.

North Arcot.

(1) Touring Veterinary Assistant Surgeon, Vellore.	Vellore, Wallajah and Arkonam taluks.
(2) Touring Veterinary Assistant Surgeon, Tiruvannamalai.	Tiruvannamalai, Chengam and Polur taluks.
(3) Touring Veterinary Assistant Surgeon, Cheyyar.	Cheyyar, Wandiwash and Arni taluks.
(4) Touring Veterinary Assistant Surgeon, Tiruppattur.	Tiruppattur and Gudiyattam taluks.

Salem.

(5) Touring Veterinary Assistant Surgeon, Salem.	Salem, Omalur, Attur, Yercaud and Mettur taluks.
(6) Touring Veterinary Assistant Surgeon, Namakkal.	Namakkal and Tiruchengode taluks.

Salem—*cont.*

Designation and headquarters.	Jurisdiction.
(7) Touring Veterinary Assistant Surgeon, Dharmapuri.	Dharmapuri, Harur and Krishnagiri taluks.
(8) Touring Veterinary Assistant Surgeon, Hosur Cattle Farm (Headquarters, Hosur Cattle Farm P.O.).	Hosur taluk and Denkanikota division.

UNDER THE DISTRICT VETERINARY OFFICER, COIMBATORE.

Coimbatore.

(1) Touring Veterinary Assistant Surgeon, Coimbatore.	Avanashi and Coimbatore taluks.
(2) Touring Veterinary Assistant Surgeon, Gobichetti-palaiyam.	Bhavani and Gobichettipalaiyam taluks.
(3) Touring Veterinary Assistant Surgeon, Palladam.	Palladam and Erode taluks.
(4) Touring Veterinary Assistant Surgeon, Pollachi.	Pollachi taluk.
(5) Touring Veterinary Assistant Surgeon, Kollegal.	Kollegal taluk.
(6) Touring Veterinary Assistant Surgeon, Udamalpet.	Udamalpet and Dharapuram taluks.

The Nilgiris.

(7) Touring Veterinary Assistant Surgeon, Ootacamund.	Ootacamund and Coonoor taluks.
(8) Touring Veterinary Assistant Surgeon, Gudalur.	Gudalur taluk.

UNDER THE DISTRICT VETERINARY OFFICER, CALICUT.

Malabar.

(1) Touring Veterinary Assistant Surgeon, Calicut.	Calicut and Ponnani taluks.
(2) Touring Veterinary Assistant Surgeon, Palghat.	Palghat taluk and British Cochin.
(3) Touring Veterinary Assistant Surgeon, Tellicherry.	Chirakkal, Kottayam and Kurumbranad taluks.
(4) Touring Veterinary Assistant Surgeon, Manantoddy.	Wynaad taluk.
(5) Touring Veterinary Assistant Surgeon, Perintalmanna.	Valluvanad and Ernad taluks.

South Kanara.

(6) Touring Veterinary Assistant Surgeon, Udipi.	Udipi and Coondapoor taluks.
(7) Touring Veterinary Assistant Surgeon, Kasaragod.	Kasaragod taluk.
(8) Touring Veterinary Assistant Surgeon, Mangalore.	Mangalore and Karkal taluks.
(9) Touring Veterinary Assistant Surgeon, Puttur.	Puttur taluk.

UNDER THE DISTRICT VETERINARY OFFICER, TRICHINOPOLY.

Trichinopoly.

Designation and headquarters.	Jurisdiction.
(1) Touring Veterinary Assistant Surgeon, Musiri.	Trichinopoly and Musiri taluks.
(2) Touring Veterinary Assistant Surgeon, Ariyalur.	Udaiyarpalaiyam and Perambalur taluks.
(3) Touring Veterinary Assistant Surgeon, Kulittalai.	Kulittalai and Karur taluks.
(4) Veterinary Assistant Surgeon in charge, Veterinary Dispensary, Lalgudi.	Lalgudi taluk.
(5) Veterinary Assistant Surgeon in charge, Veterinary Dispensary, Ariyalur.	Ariyalur Deputy Tahsildar's jurisdiction of Udaiyarpalaiyam taluk.

Tanjore.

(6) Touring Veterinary Assistant Surgeon, Tanjore.	Tanjore, Papanasam and Kumbakonam taluks.
(7) Touring Veterinary Assistant Surgeon, Mayavaram.	Mayavaram, Nannilam and Shiyali taluks.
(8) Touring Veterinary Assistant Surgeon, Tiruvarur.	Negapatam and Mannargudi taluks.
(9) Touring Veterinary Assistant Surgeon, Pattukkottai.	Tirutturaippundi, Pattukkottai and Arantangi taluks.

UNDER THE DISTRICT VETERINARY OFFICER, MADURA.

Madura.

(1) Touring Veterinary Assistant Surgeon, Madura.	Madura, Melur and Tirumangalam taluks.
(2) Touring Veterinary Assistant Surgeon, Periyakulam.	Nilakkottai, Kodaikanal and Periakulam taluks.
(3) Touring Veterinary Assistant Surgeon, Palni.	Dindigul and Palni taluks.

Ramnad.

(4) Touring Veterinary Assistant Surgeon, Sivaganga.	Sivaganga and Aruppukkottai taluks.
(5) Touring Veterinary Assistant Surgeon, Paramagudi.	Ramnad, Paramagudi and Mudukulattur taluks.
(6) Touring Veterinary Assistant Surgeon, Srivilliputtur.	Srivilliputtur and Sattur taluks.
(7) Touring Veterinaay Assistant Surgeon, Tiruppattur.	Tiruppattur and Tiruvadanai taluks.

Tinnevelly.

(8) Touring Veterinary Assistant Surgeon, Kovilpatti.	Kovilpatti and Sankarankovil taluks.
(9) Touring Veterinary Assistant Surgeon, Tinnevelly.	Tinnevelly and Srivaikuntam taluks.

Tinnevelly—*cont.*

Designation and headquarters.	Jurisdiction.
(10) Touring Veterinary Assistant Surgeon, Nanguneri.	Nanguneri and Tiruchendur taluks.
(11) Touring Veterinary Assistant Surgeon, Tenkasi.	Tenkasi, Ambasamudram, Anjengo and Tangasseri taluks.

EXPLANATION TO ABBREVIATIONS USED.

(1) V.A.S. i/c., V.D. denotes.	Veterinary Assistant Surgeon in charge, Veterinary Dispensasry.
(2) T.V.A.S. denotes	Touring Veterinary Assitant Surgeon.

30. Madras Veterinary College.

Prospectus.

1. *General.*—The College affords theoretical and practical instruction in subjects appertaining to the Veterinary Profession. The staff sanctioned at present for the College consists of a Principal, seven lecturers, assistant lecturers and a subordinate establishment. The responsibility for the discipline and management of the College is vested in the Principal who is under the control of the Director of Veterinary Services, Madras. Full clinical and other facilities are afforded to meet the educational requirements of students preparing for the diploma in Veterinary Science. A veterinary hospital, laboratory, museum, library, shoeing forge and students' hostel are attached to the College.

2. *Admission.*—Candidates are eligible for admission without distinction of caste or nationality. They must not be under eighteen years of age at the commencement of the term for which admission to the College is desired. In ordinary circumstances, no person over twenty-two years of age will be admitted. No candidate whose domicile is in an Indian State will be admitted to the College without the previous sanction of Government. Students are admitted to the College by selection which is made by a Committee consisting of four members appointed by Government and the Principal. Applications for admission should be made in writing in the prescribed form printed at the end and they should be submitted so as to reach the Principal not later than the 15th June of each year and should be accompanied by certificates prescribed in the note under the appended form of application. The minimum general educational qualification required of applicants is a pass in the Matriculation or European High School Examination or Secondary School Leaving Certificate examination with the percentages of marks prescribed in Note (2) in the application form, but candidates with higher educational qualifications will be preferred.

In the event of a candidate being selected to appear before the selection committee he will be informed of the particular day and hour when and the place at which he should present himself for personal selection. Candidates when admitted will be considered to be on probation for the first two months of the course and may be removed if found to be unsatisfactory.

3. *Course of Study.*—The course of study for the Diploma extends over three years. The students of each year's course form a separate class. Promotions from one class to another is made with reference to the results

of the annual examinations. Any student who fails in the annual examination for the first or second year class for two consecutive years shall not be allowed to continue his studies in the College.

4. *Curriculum of Studies*—(i) *First Year.*—(1) Anatomy ; (2) Chemistry (Inorganic and Organic); (3) Biology (Botany and Zoology) ; (4) Handling of animals.

During this year students are given practical instruction in nursing, handling, casting and securing animals as well as in the names of the instruments and appliances used in ordinary practice.

Candidates who hold the degree in Agriculture are not required to attend the lectures or pass the examination in Biology and Chemistry.

Candidates who have obtained the B.A. degree in Chemistry or Botany need not attend the classes or the examination in Chemistry or Botany as the case may be.

(ii) *Second Year.*—(1) Histology and Embryology; (2) Physiology including Bio-Chemistry ; (3) Pathology, Bacteriology and Immunology; (4) Parasitology including Protozoology; (5) Pharmacology including Materia Medica ; (6) Surgical Anatomy and Shoeing.

During this year, students are required to attend hospital practice and receive clinical instruction. They are also required to attend at the forge and pharmacy and are given demonstrations in Surgical Anatomy.

Note.—Numbers (1) and (2) as well as (3) and (4) will be examined together.

(iii) *Third Year.*—(1) Surgery, including Obstetrics, soundness and jurisprudence ; (2) Therapeutics and Toxicology ; (3) Preventive Medicine including Meat and Milk Inspection—Sanitary Law ; (4) Hygiene, including Genetics and Nutrition.

During this year, students are required to perform the duties of clinical clerks and dressers to perform operations on dead subjects and afterwards on living animals, to conduct post-mortem examinations and generally to carry out practically all the duties appertaining to their profession.

All the students are required to undergo a course of equitation. A student absenting himself without leave from a lecture or from a practical riding class is liable to be fined.

5. *Fees.*—A tuition fee of Rs. 90 per annum shall be levied from the students coming from the Madras Presidency ; students coming from outside the Madras Presidency shall pay a tuition fee of Rs. 400 per annum ; the tuition fees are payable in advance. A student who fails in the annual examination in any of the classes and who is required to undergo a further course in the same class before he can be allowed to appear for the next annual examination shall pay a proportionate tuition fee based on Rs. 90 per annum if he is a student coming from the Madras Presidency and Rs. 400 per annum if one coming from outside. Students appearing for the annual as well as supplemental examinations should pay a fee of Rs. 15 being the examination fee. A fee of Rs. 3 for the first and second terms and Rs. 2 for the third term is also payable by each student as sports fee.

6. *Scholarships.*—Four scholarships of the monthly value of Rs. 15 each shall be awarded annually and distributed among three members of the depressed and backward classes and a poor and deserving Muhammadan. A student already in the enjoyment of a scholarship from a local body or a private person is not eligible for a Government scholarship.

The continuance of all scholarships is conditional on the good behaviour of the holders and the satisfactory progress they make in their studies.

7. *Terms and Time-table.*—Each year comprises three terms, July to September, October to December and January to March. Tables of the times and subjects of the lectures to which both lecturers and students should adhere will be posted on the notice board at the commencement of each term.

8. *Vacations and Holidays.*—In addition to the miscellaneous public holidays, the students are allowed the following vacations and holidays :—

Midsummer vacation (three months).
Michaelmas holidays (one week).
Christmas and Easter holidays (Gazetted).

Students are required to attend hospital cases in turn during the vacation and holidays. Leave of absence is granted by the Principal only. Scholarship-holders may, at the discretion of the Principal, be granted casual leave with scholarships for not more than five days at a time or ten days in the year but no casual leave will be granted in continuation of other holidays with scholarships. Any further leave to scholarship holders except sick leave for a month will be subject to stoppage of scholarship. Leave of absence in each case of illness will be recognized only on the production of a certificate from a duly qualified medical practitioner.

9. *Examinations.*—Examinations are conducted by a written as well as oral test and are held annually in March in all the classes. For admission to the examination, candidates must have studied at the College for such times as may be prescribed and attended at least three-fourths of the year's lectures and practical work in their respective classes. Except in the case of provisionally promoted students of the first or second year class, any student who fails in any of the annual examinations shall be required to attend the same class at least during the second and third terms of the Academic year of the College and put in an attendance of not less than 75 per cent of the working days in those terms before he can be allowed to appear for the next examination.

10. *Diploma.*—A diploma as Graduate in Veterinary Science is awarded to students who have gone through the full course of three years' study at the College and have passed the final examination.

11. *Hostel.*—The hostel attached to the College provides accommodation for 120 students. All students must reside in the hostel except those permitted by the Principal to reside outside. A room rent of Rs. 3 per mensem will be levied from all students residing in the hostel. In addition, all students residing in the hostel will be required to pay every month a general fund subscription of As. 8 electric current charges varying from Re. 1 to Rs. 1–8–0, and water charges from As. 8 to Re. 1. The boarding charges for each student will generally be between Rs. 15 and Rs. 20 per mensem.

12. *Prospects of Students who pass out of the College.*—Graduates of the College are eligible for appointment as Veterinary Assistant Surgeons in the Civil Veterinary Department, Madras, but Government in no way guarantee employment for the graduates.

Graduates of the Madras Veterinary College have in addition fair prospects of employment as Municipal Cattle Inspectors and as Assistants in charge of Veterinary Dispensaries established by private proprietors and Indian States. It will be the duty of the Principal to render all reasonable assistance to passed students in securing suitable employment.

Form of Application for admission into the Madras Veterinary College.

(*To be submitted so as to reach the Principal on or before 15th June of each year.*)

1. Name of the candidate in full.
2. His occupation.
3. Place of birth (the name of the place and the district to which he belongs should be specified).
4. Name of the parent or guardian.
5. Residence.
6. Occupation of the parent or guardian.
7. School and class last attended.
8. Highest examination passed and date of passing.
9. Vernaculars spoken, placing the mother tongue first and then the other Vernaculars in order of knowledge.
10. Age—Date of birth.
11. Religion—[Whether Hindu (Brahman or Non-Brahman), Muhammadan, Indian Christian, Anglo-Indian or European, etc. If belonging to depressed and backward class, specific mention should be made of the particular community to which the candidate belongs.]
12. Stature and chest girth.
13. Candidate's address in full.

Date of application. *Signature of the candidate.*

N.B.—(i) The application should be accompanied by certificates of (1) age, (2) physical fitness from a registered medical practitioner not below the rank of an Assistant Surgeon, (3) moral character from the head of applicant's school, college or office and (4) a certificate showing that the applicant has passed the Marticulation Examination of an Indian University or obtained a Secondary School-Leaving Certificate or has passed the European High School examination.

(ii) A minimum of 45 per cent of marks in English and the percentages in other subjects in the School Final Examination both under the Old and New Schemes as are prescribed for recruitment to Public Service will ordinarily be required of all candidates. The applicant should state if he has been declared eligible to take a College course. The S.S.L.C. book or a true copy of the marks obtained at the Public Examination should also be furnished. In the case of other candidates, original certificates should be furnished or a reference made to the page and date of the *Fort St. George Gazette* notifying his success at such examination.

T. J. HURLEY,

6th April 1934. *Principal, Madras Veterinary College.*

III.—CO-OPERATION.

31. The Ten Points of Co-operation.

(1) **Co-operation is combination,**
(2) **voluntarily,**
(3) of the **weak,**
(4) to promote **material welfare,**
(5) by **pooling** their credit,
and their honesty,
and their labour,

(6) on terms of **equality** among themselves, no member having a louder voice in its affairs than another,

(7) encouraging confidence and credit by **open dealing** having no secret or underhand or *benami* transactions,

(8) each member considering the **welfare of the society,**

(9) the society being solicitous of the **interest of each member** and both members and society assisting to build an active society so that it may be strong to help its members, and

(10) thus promoting the **moral welfare and happiness** of the members.

32. Co-operative Capsules.

(1) Co-operation is not charity.
Co-operation is business—good business.

(2) He who repays
May be trusted with more.
He who delays
May beg at the door.

(3) Plant a rupee every month in the bank
And your harvest will come without rain in the tank.

(4) A rupee a month for 360 months amounts to a thousand rupees.

(5) Promptitude is the mother of investments.

(6) A sowcar takes toll of everything he buys or sells.
Join a co-operative society and be your own sowcar.

(7) To lavish easy credit on those unaccustomed to its proper use is to condemn the borrowers certain financial destruction.

33. Bright Days for Cotton Growers.

GREATER PROFIT THROUGH CO-OPERATION.

Tiruppur Co-operative Trading Society, Ltd., Tiruppur, Coimbatore District.

The primary object of the Tiruppur Co-operative Trading Society, Ltd., at Tiruppur in the Coimbatore district is to provide a good market for the agricultural produce in general and cotton in particular. Every agriculturist can reap its fruits either direct or through village societies or seed societies.

(1) A godown at a cost of Rs. 8,500 has been built for the sole benefit of the members; for storing their produce safe for a good market. As the patronage of the members increases, the trading facilities of the society also increases. The shares of the society are fixed at Rs. 5 each to facilitate the agriculturists of all standings to join the society.

(2) Money is advanced by the society on the pledge of cotton, lint, cotton seed and other commodities such as ragi, garlic, coriander, etc. Three thousand and sixty-eight (3,068) pothies of cotton, 1,236 candies of lint and 4,332½ bags of cotton seeds have been sold through the society during the year 1933.

(3) In pursuance of the Indian Central Cotton Committee's Scheme for the multiplication of C-02 cambodia seeds in the district intensive work is being done by the society in the production and distribution of C-02 seeds. The cotton collected from the seed farm ryots in the Tiruppur and Avanashi areas where cultivation is being carried on under the direct supervision of Special Agricultural Demonstrators is graded and ginned under the immediate supervision of the Business Manager who is also an agricultural officer. The seeds thus obtained are dried, stocked, bagged and sealed by the Business Manager and sales effected through the society. Four thousand nine hundred and eighty-six (4,986) bags of pure C-02 seeds were produced under the seed development scheme in the year 1933 and out of this 1,050 bags were distributed to 580 members in 37 villages for an area of 4,112 acres under the supervision of 4 Agricultural Demonstrators, as against 508 bags in 1932 distributed among 250 ryots in 11 villages for an area of 2,024 acres under the supervision of 2 Argricultural Demonstrators. The profit earned by the society on trading during the year 1933 was Rs. 4,611-12-0.

All endeavours are thus being made by this society to enable the cotton growers of this district to produce the higher grade stuff by supplying good seeds enabling the agriculturists at the same time to get greater and better produce. The aim of the society is chiefly to benefit the agriculturists, the cotton growers in particular.

34. Short Note on the working of the Salem Weavers' Co-operative Society, Ltd., Fort, Salem.

The society was first started in 1930 with object of tackling the problem of unemployment among weavers. Its existence now acts as a check on the wages paid to the weavers by the merchants in Salem. It produces excellent articles of standard quality. It purchases Sholapur Yarn, and gets them dyed specially, for it by a member of the society, who has undergone special training for the purpose.

The society has been doing useful work. It is able to maintain an establishment at a cost of Rs. 400 per month. That the society has sound financial position can be gauged from the following figures :—

	RS.	A.	P.
Share capital	12,957	4	0
Reserve fund	989	3	0
Reserve for bad and doubtful debts ...	3,294	0	0

The fact that the work undertaken by the society is unique of its kind, also attracts distinguished visitors from native states, who are interested in the Cottage Industry.

The society is now giving employment for about 200 weavers. It is able to manufacture articles to the extent of Rs. 40,000 every year, and sells them to the best advantage of both the society and the consumers. More applications for membership are coming in from other weavers and the society is trying to give a shelter to as many as possible consistant with its capacity to manage and to find suitable market for its products.

35. The Lalgudi Sivagnanam Agricultural Co-operative Society, Trichinopoly District.

The Lalgudi Sivagnanam Agricultural Co-operative Society was started in the year 1925 with the object of promoting the condition of the agricultural population who reside in its area of operations by disseminating a knowledge of the latest improvements in agriculture and by distributing seeds, manures and agricultural implements to the ryots. The society has taken on lease a farm extending over 40 acres of wet land for demonstrating the utility of scientific and improved methods of cultivation, especially in paddy and sugarcane. The breeding bull maintained by the society served 55 times during the year ending 31st March 1932 and secured an income of Rs. 55 to the society and also Rs. 100 in the shape of premium from Government. The society is acting as a commission agent of the Imperial Chemical Industries (India), Madras, and is doing extensive business by sale of manures on consignment basis. The society has several branches and sub-depots in various places in the Lalgudi and Udaiyarpalaiyam taluks. During the year ending 31st March 1932 manure to the value of Rs. 1,43,852-2-0 was sold. On the whole the society worked at a net profit of Rs. 4,539-9-0 during the year 1931-32. The Reserve Fund built up to the end of the year was Rs. 5,991-1-0.

36. The Tuticorin Co-operative Crop Loan and Sale Society, Ltd., No. O. 831, Tuticorin.

Registered under Act II of 1912 (India).

This is a society whose main object is to facilitate the marketing of cotton produced by its members. Loans are given to members on the security of cotton. Superior cotton lint, Kambodia and Karungani seeds are always available for sale at advantageous prices. Further particulars can be obtained from the Secretary of the Society.

37. The South Arcot Central Co-operative Groundnut Sale Society, Ltd.

Groundnut cultivators, Help yourselves!

The South Arcot Central Co-operative Groundnut Sale Society has set up three warehouses at Cuddalore Old Town, Vriddhachalam and Tirukkoyilur. Each of these warehouses is in the charge of a Co-operative Inspector or an Agricultural Demonstrator who is called the Ware house Officer. This officer receives the groundnuts brought by cultivators to the warehouse, weighs them in his standard balance and arranges for their sale. The officer saves the ryots from being cheated in weights and in weighment. Being in touch with the market, he is able to find the highest purchaser for the ryot. If the ryot wishes to withhold his produce in the hope of obtaining a higher price, the officer allows him to stock his produce in the warehouse and abide his time. Where necessary he accommodates the ryot with a loan from the Sale Society on the security of his produce kept in the warehouse. If the groundnut cultivator in the South Arcot wishes to help himself, he has only to take a share of Re. 1 in the groundnut Sale Society and take his groundnuts to the

Warehouse Officer. A commission of annas 4 is charged by the Warehouse Officer for every candy of groundnuts sold through him. But the gain to the ryot is several rupees per candy. "If the ryot stands in need of help to finance his cultivation, he has to join the Local Co-operative Society where facilities are given to borrow short term loans. Considering the present plight of the ryots and the fall in prices, the rate of interest on groundnut loans has been reduced from $9\frac{3}{8}$ per cent to $8\frac{1}{4}$ per cent to enable the ryots to get some margin of profit after meeting the cultivation expenses. Such loans are recovered at the time of sale of his produce when alone he can repay his dues without any strain on his small resources." If ryots recognize that the warehouses have been organized for the benefit, if they avail themselves of the resources of the local co-operative societies to finance their cultivation, if they require such help and if the bulk of them sell their groundnuts only through the warehouses, there is a possibility of pulling up the price of groundnuts in the market and improving a little their economic position.

The three warehouses have been doing useful work and a statement of the business transacted by them from 1st April 1933 to 31st January 1934 is given below :—

Name of warehouse.	Quantity weighed.		Quantity sold.		Value of groundnut sold.		
	CANDIES.	LB.	CANDIES.	LB.	RS.	A.	P.
1. Cuddalore O.T. ...	7	14	1,130	212	24,655	15	6
2. Tirukkoyilur ...	3	259	673	478	15,740	14	9
3. Vriddhachalam.	4	8	478	348	9,514	1	0

38. The Vizianagram Khaddar Weaving and Spinning Co-operative Society, Ltd., Vizianagram.

One of the primary objects of the society is to create a means of living for the agriculturist during the off season when he, his wife, his children and other members of the family can engage themselves for a few hours off and on in spinning yarn from the cotton supplied by the society.

It may be of interest to note that the society prepared goods worth Rs. 10,014 and sold the same to the public and derived a net profit of Rs. 963–11–0 during the year 1931–32.

The society is thus encouraging cottage industry on a modest scale. The weaver members weave cloths of several patterns and textures to suit the taste of the public. The society gives guarantee that the cloth offered for sale is of pure home spun material. Khaddar cloth supplied by this society is noted for its cheapness and durability. The general public and other co-operative institutions can make a trial purchase and if satisfied, encourage the cottage industry which is started with the sole object of providing livelihood to the half-starving poor during the off season.

39. Anakapalle Loan and Sale Co-operative Society, Ltd.

Anakapalle and Chodavaram taluks are the two in the Vizagapatam district, where sugarcane is produced on a large scale. Before the inception of the Anakapalle Loan and Sale Co-operative Society, the ryots used to be completely at the mercy of middleman sowcars and they had to part with their jaggery only to swell the profits of such middlemen. It was

on 13th March 1927 that the Anakapalli Loan and Sale Co-operative Society was started on its work with the object of removing the prevailing disabilities. It is freely advancing loans to the ryots and acting as their agent for the sale of jaggery. The society has all these years been doing excellent work and gained much popularity. It has on its rolls now 41 individuals and 62 societies as members. The paid-up share-capital is Rs. 2,490. A sum of Rs. 85,000 was obtained from the Central Bank under loans and cash credit and the same was repaid by the end of the year. The society received and sold jaggery of all grades worth about Rs. 51,400 making a net profit of Rs. 250. During this year by the end of April 1933 it sold about Rs. 60,000 maunds of jaggery. Jaggery of all grades and varieties can be had at moderate prices from this society during the season from December to the end of May. Further particulars can be obtained from the Secretary of the Society.

40. Co-operative Sugar Manufacturing Concerns.

The Etikoppaka Co-operative Industrial Credit Society, Limited, situate at a distance of 4 miles from Narasapatam Road Railway Station, M.S.M. Railway, and the Sri Rama Krishna Co-operative Industrial Credit Society, Limited, in Tummapala village, which is at 2 miles from Anakapalli Railway Station, M.S.M. Railway, have been registered and started on their work in the month of April 1933. These are the only 2 sugar manufacturing societies registered under the Co-operative Societies Act VI of 1932 in the Madras Presidency. It is hoped that fine and refined sugar can be prepared direct from cane juice from 1st January 1934 onwards. General public and co-operative institutions are requested to patronise the new Institutions.

41. Note on the working of Calicut Cottage Industries Co-operative Society, Ltd., No. F. 736, Calicut—Malabar.

(1) The Calicut Cottage Industries Co-operative Society, Ltd., for women was started in Calicut in the year 1926 for providing with occupation for women members at spare hours, particularly middle and poor class women not accustomed to go out to field and factories for manual labour. It is also the intention incidentally to develop Cottage Industries. The by-laws contemplate the promotion of spinning, weaving, keeping cows, etc., and making envelopes. It has been possible only to develop the envelop-making industry and enable some women to earn a living thereby. It is hoped that by co-operative effort the poor and the middle class Indian women of the locality will be enabled to enjoy all the profits of the industry and the benefit of their labour, by eliminating the middlemen and to build up a good capital and reserve. The society sold envelopes to co-operative institutions and others to the value of Rs. 330 in 1932–33, only a very small margin of profit having been charged on the product. The following varieties of envelopes are available in the society for sale :—

(1) 24 lb. 5″ × 3″ size Manilla envelopes.
(2) 22 lb. Indian tinted paper square envelopes.
(3) 24 lb. Indian tinted paper square envelopes.

This is a novel venture on co-operative lines and in order that it may develop to the full extent, it is necessary that all co-operative institutions should extend their sincere co-operation to this society in the matter of consumption of its finished products.

The society is further making attempts to maintain a dairy farm for the supply of pure milk to the public and it has been able to collect about Rs. 1,000 as share capital for the working of the scheme.

IV.—INDUSTRIES.

42. List of Government Technical and Industrial Schools in the Presidency.

Name.	Subjects taught.
1. School of Arts and Crafts, Madras.	Cabinet making, wood carving, inlaying, metal working, gold and silversmithing, jewellery work, lacquer work, decorative painting, modelling, engraving, painting on cotton design, cane work, and drawing and painting generally.
2. Government School of Technology, Madras.	Mechanical engineering, electrical engineering, plumbing and sanitary science, applied mathematics and mechanical drawing and printing.
2-A. Preparatory Trades School.	Of general education for those who wish to become artisans.
3. Government Textile Institute, Washermanpet, Madras.	Cotton spinning (power), handloom weaving, carpet weaving, sericulture, silk reeling, silk throwing, manufacture of woollen pile carpets, hosiery, dyeing, cloth-printing, textile testing and wool spinning.
4. Government Industrial School, Madura.	Wood working, general mechanic's work, oil engine tending and engineering trades.
5. Government Trades School, Mangalore.	Mechanic's course, wood worker's course and electric wiring.
6. Government Industrial School, Calicut.	Cabinet making and mechanic's engineering.
7. Government Industrial School, Bellary.	Cabinet making, general mechanic's work and oil engine driving.

In addition to the above institutions which are directly controlled by Government, there are about 70 aided industrial schools in the Presidency. **Any further information in regard to industrial education may be had from the Director of Industries, Chepauk, Madras.**

43. Rules for the levy of Fees for Work done by the Industrial Engineering Branch.

Subject to the rules hereinafter mentioned the Department of Industries gives general information and advice, assists in the preparation of plans and in the

purchase and erection of machinery, undertakes the systematic inspection of installations, and places at the disposal of the public the following plants :—

(i) Hand-boring apparatus.
(ii) Power drills.
(iii) Portable pumping plant.
(iv) Blasting apparatus.
(v) Sugarcane-crushing mills.

2. The services of the Department are offered subject to the following general conditions :—

(i) **All fees or other charges leviable under the rule governing departmental assistance are strictly payable in advance.**

Note.—(1) In exceptional cases where the levy of fees is likely to operate as an undue burden on the slender resources of applicants, the Director of Industries may, at his discretion, remit such fees, wholly or in part.

(2) **Services rendered to co-operative societies will be charged for only at half the usual rates.**

(ii) Refunds of fees will not generally be made, but in the case of advances, any surplus which may remain unspent after the work is completed will be returned.

(iii) Parties who have hired departmental plants will not in any circumstances be allowed to sub-let them.

I.—Information and Advice.

3. **General information and advice are given free of charge so far as the information is available and advice is given without local inspection.**

4. **In cases where information and advice can be given only after local inspection, such inspection will be arranged for on payment of a fee of Rs. 10.**

II.—Purchase and Erection of Machinery.

5. **The Department will, when so desired, undertake the ordering of plant, the preparation of plans and the supervision of the erection of machinery.** In such cases a deposit of not less than Rs. 250 or approximately 15 per cent of the value of the plant, whichever is greater, must be made. For the purposes of calculating fees, the value of second-hand plant will be taken to be its present value.

The fee actually charged for this service is 2 per cent on actual cost of machinery plus Rs. 10 inspection fee and Rs. 10 for the preparation of plans in cases where the cost of machinery exceeds Rs. 1,250. If an inspection fee has previously been paid on account of the same scheme, no further inspection fee will be demanded.

If building work is to be supervised or if the plant is to cost more than Rs. 10,000, special terms will be arranged.

6. If an applicant wishes to abandon his scheme after an inspection has been made and before any plant has been ordered, all fees and deposits paid will be refunded, except the inspection fee of Rs. 10 and, if blue-print plans have been prepared, the fee of Rs. 10 for the preparation of plans.

7. All materials and labour must be found by the applicant.

8. No plans will be prepared and no plant will be ordered unless the plant is to be erected by the supplying firm or its erection is to be supervised by the Department of Industries.

9. Individuals who have already purchased plant may apply for the supervision of its erection by the Department on the same terms as above. The Director, however, reserves the right of causing an inspection of the plant to be made (costing Rs. 10) and, notwithstanding such inspection, the Director may decline to sanction departmental assistance, if he considers the plant unsuitable, badly designed or in any other way open to objection.

10. When the engineering services of the Department are required for purposes other than the original erection of plant, such services will be charged for at daily rates as follows :—

For a supervisor	Rs. 10 for the first day plus Rs. 6 for every subsequent day.
For a mechanic	Rs. 7–8–0 for the first day plus Rs. 4 for every subsequent day.

If owing to causes for which the applicants are responsible, there is any break in the continuity of the service, the fees chargeable for the first day after resumption of the work will be Rs. 10 for a supervisor and Rs. 7–8–0 for a mechanic.

III.—Systematic Inspection of Installations.

11. **The Department will arrange for the systematic inspection of installations.**—Inspections will be of two kinds, viz., "routine inspections" made at the convenience of the Department and "special inspections" made on the urgent requisition of the applicant.

12. An initial fee of Rs. 10 will be levied, which will cover the cost of three routine inspections, but no refunds will be made, if the value of the fee is not completely utilized. It will also cover the cost of special visit in the case of not more than two sudden breakdowns per annum. Special inspections or visits in excess of those covered by the initial fee will be charged for at the rate of Rs. 5 per visit for a mechanic and Rs. 7–8–0 for a supervisor.

IV.—Boring Plant—Hand-boring Apparatus.

13. **Enquiries concerning hand-boring apparatus should be addressed in the first instance to the local Supervisors of Industries, or to the Local Assistant Industrial Engineer, or to the Director of Industries, Post Box No. 432, Chepauk, Madras.**

14. **The hand-boring tools in the possession of the Department will drill to a depth of 100 to 150 feet in ordinary soils but are unsuitable for boring in rocky strata. Where deeper borings or borings in rocky strata are required, a power drill—*vide* Section V infra—should be used.**

15. When a boring party is established in a taluk, the fact will be notified in the district gazette. Applications for borings within the notified area will be registered on payment of a transport fee of Rs. 7–8–0 and an advance fee of Rs. 8 to cover fees for four days. The advance payment of transport fee will, however, be waived if the applicant signified his intention in his application that he is prepared to transport the set himself at his own expense within five days of the date of offer.

In cases where a set has to work in a well, a further advance of Rs. 8 should be paid to cover fees for delay, if any, in supplying labour for removing the set from the well after completion or stoppage of the work.

16. Borings outside the notified areas cannot be undertaken except by special arrangement and on special terms to be settled beforehand. Ordinarily applications for borings outside the notified areas will be recorded for future reference. They will not be registered and no fees and advances will be accepted therefor.

17. The fee for the use of the hand-boring tools is Rs. 2 a day. This fee covers the hire of the tools and the salary of the maistri in charge thereof. The applicant must, however, provide labour necessary for operating the set.

18. The advance of Rs. 8 will cover the fees for four days. When the original advance is exhausted, further advances in sums of at least Rs. 8 should be paid at once. As borings will on no account be put down on credit, the work will be stopped and the tools removed immediately the advance is exhausted, unless further advances are paid.

19. The result of a boring will be communicated to the applicant who will be advised of the steps that he should take to utilize the water-supply available.

20. In cases where sub-artesian water is met with, arrangements will be made, if the applicant so desires, to put down permanent lining tubes, the cost of which must be borne by him.

21. Hand-boring sets may also be hired by the month on prepayment of the following rates :—

For periods up to one month ...	Rs. 2 a day subject to a maximum of Rs. 40 a month.
For periods of over one month but not exceeding three months.	Rs. 40 a month subject to a maximum of Rs. 100.
For periods not exceeding six months.	Rs. 40 a month subject to a maximum of Rs. 200.

These are exclusive of transport charges.

22. In the case of unsuccessful borings put down by hand drills, the advance and the daily hire, but not transport charges, paid by the applicants will be refunded. Whether a boring is successful or not will be decided by the Director of Industries on the merits of each case and his decision will be final.

V.—Boring Plant—Power Drills.

23. **The power drills with which the Department is provided will ordinarily drill to a depth of 350 feet in any kind of rock.** Assistant Industrial Engineers may stop any boring work at any stage below 200 feet if it is found that the stratum worked through is such as seriously to endanger the safety to the drill.

24. **Enquiries concerning power drills should be addressed either to the local Supervisor of Industries, or to the local Assistant Industrial Engineer or to the Director of Industries, Post Box No. 432, Chepauk, Madras.**

25. No fees or advances will, in the first instance, be demanded but a register of applications for the use of power drills will be maintained.

26. The order in which the registered applications will be attended to will be decided by the Director of Industries with reference to the locality

where borings have to be put down, and applicants will be duly informed when a power drill can be placed at their disposal. Immediately on receipt of the notice, the applicant should remit a transport fee of Rs. 75 and an advance of Rs. 100. If the amount is not paid within five days after the receipt of the notice, the application will be regarded as cancelled.

27. The fee for the use of a power drill is Rs. 6 a day subject to a minimum of Rs. 30. This fee covers the hire of the drill and the wages of the trained staff necessary for its working. All other charges connected with the work should be borne by the applicant.

28. The applicant should supply coolie labour and provide the fuel, oil and other stores required for the use of the plant.

29. The original advance of Rs. 100 covers the hire of the drill for about sixteen days. When that sum is exhausted, further advances of at least Rs. 50 each must be paid at once. As boring will on no account be done on credit, the work will be stopped and the drill removed immediately the advance is exhausted, unless further advances are duly paid.

30. The results of a boring will be communicated to the applicant, who will be advised of the steps that he should take to utilize the water-supply available.

31. In cases where sub-artesian water is met with, arrangements will be made, if the applicant so desires, to put down permanent lining tubes, the cost of which should be borne by him.

VI.—Pumping Plant.

32. **The engines in the possession of the Department are capable of pumping from 150 to 325 gallons per minute on a total lift up to 50 feet.** High speed testing engines will not be worked for more than four hours at a stretch or for more than eight hours during a day and night, viz., 24 hours. The latter part of this rule applies also to ordinary (crude oil) pumping sets.

33. **Enquiries concerning pumping plant should be addressed either to the local Supervisor of Industries, or to the local Assistant Industrial Engineer or the Director of Industries, Post Box No. 432, Chepauk, Madras.**

34. No fees or advances will, in the first instance, be demanded, but a register of applicants for the use of pumping engines will be maintained.

35. The order in which the registered applications will be attended to will be decided by the Director of Industries with reference to the locality, and applicants will be duly informed when a pumping plant can be placed at their disposal. Immediately on receipt of the notice, the applicant should pay a transport fee of Rs. 50 and an advance of Rs. 20. If the amount is not paid within five days after receipt of notice, the application will be regarded as cancelled. The advance payment of transport fee will, however, be waived if the applicant signifies his intention in his application that he is prepared to transport the plant himself at his expense within five days of the date of offer.

36. The fee for use of a pumping plant is Rs. 3 a day subject to a minimum of Rs. 15. This fee covers the hire of the plant and the wages of the trained driver in charge thereof. All other charges connected with the work must be borne by the applicant.

37. The applicants should supply coolie labour and provide the fuel oil and other stores required for the plant.

38. The advance of Rs. 20 covers the hire of the plant for about six days. When that sum is exhausted, further advances of at least Rs. 20 each should be paid at once. As pumping will on no account be done on credit, the work will be stopped and the plant removed immediately the advance is exhausted, unless further advances are duly paid.

39. Certain special pumping plants working on liquid fuel which will be supplied by the party are also available for monthly hire on prepayment of the following terms :—

	RS.
For one month	75
For three months	200
For six months	400

A transport fee of Rs. 50 will be levied in addition to cover the cost of carriage of plant except in cases where the applicants undertake to transport the plant themselves within the specified time. The conditions of monthly hire are otherwise the same as those governing daily hire. The Director will have the right to direct the removal of the plant when in the Assistant Industrial Engineer's opinion it is no longer required, but no refund will be made if the plant is not required for the full period for which it has been hired. Applicants may extend the period of hire by paying the difference according to the above scale, provided that the hiring is continuous.

VII.—Blasting Apparatus.

40. The blasting apparatus in the possession of the Department is intended for the explosion of wells or boreholes with a view to increasing the water-supply. Blasting will ordinarily be of use only in hard rocky soils.

41. Enquiries concerning blasting apparatus should be addressed to the local Supervisor of Industries, to the local Assistant Industrial Engineer, or to the Director of Industries, Post Box No. 432, Chepauk, Madras.

42. Applications for the use of the apparatus will be registered on payment of an advance of Rs. 10. The order in which the registered applications will be attended to will be decided by the Director with reference to the locality, and the applicants will be duly informed when the apparatus can be placed at their disposal. If the blasting apparatus is not accepted when offered, the advance will be forfeited.

43. The advance (Rs. 10) covers the cost of one blast. For each extra blast a fee of Rs. 7-8-0 will be charged.

44. The results of the blasting will be communicated to the applicant, who will be advised of the steps that he should take with reference to the results obtained.

VIII.—Sugarcane-crushing Mill.

45. The Department is in possession of a small number of power-driven sugarcane-crushing mills which are available for hire.

46. Enquiries concerning sugarcane mills should be addressed to the local Supervisor of Industries, or to the local Assistant Industrial Engineer or to the Director of Industries, Post Box No. 432, Chepauk, Madras.

47. No fees or advances will, in the first instance, be demanded, but a register of applications for the use of the mills will be maintained.

48. The order in which the registered applications will be attended to will be decided by the Director of Industries with reference to the locality and applicants will be duly informed when a mill can be placed at their disposal. Immediately on receipt of the notice, the applicant should remit an advance of Rs. 50 if a mill alone is required and Rs. 100 if a combined mill and engine is required. If this amount is not paid within five days after the receipt of the notice, the application will be regarded as cancelled.

49. A transport fee of Rs. 50 will be charged. The advance payment of transport fee will, however, be waived if the applicant signifies in his application that he is prepared to transport the plant himself at his own expense within five days of the date of offer.

50. The monthly hire charges for the use of the plant are Rs. 50 for a mill and Rs. 100 for a combined mill and engine. The charge covers the hire of the plant and the wages of the driver in charge of the engine. All other charges connected with the work must be borne by the applicant.

51. The applicant should supply coolie labour and provide the fuel, oil and other stores required for the engine.

52. The advance of Rs. 50 or Rs. 100, as the case may be, covers the hire of the plant for a month. When the sum is exhausted, further advances equivalent to at least a month's hire should be paid at once. As the plant will on no account be lent on credit, the work will be stopped and the plant removed immediately the advance is exhausted, unless further advances are duly paid.

Bezwada Division.

District.	Assistant Industrial Engineer's headquarters.	Supervisor's head-quarters.
Ganjām ... ... Vizagapatam	Bezwada	Vizagapatam.
Kistna ... ... Guntūr	Do.	Bezwada.
East Gōdāvari ... West Gōdāvari ...	Do.	Rajahmundry.
Nellore	Do.	Nellore.
Bellary ... ... Kurnool	Do.	Bellary.

Coimbatore Division.

District.	Assistant Industrial Engineer's headquarters.	Supervisor's head-quarters.
Cuddapah ... ... Anantapur	Coimbatore	Cuddapah.
Malabar ... ... South Kanara ... ... Anjengo	Do.	Mangalore.
North Arcot ... ... Chittoor	Do.	Vellore.
Coimbatore ... ... Nilgiris ... ... Salem	Do.	Coimbatore.

Tanjore Division.

District.	Assistant Industrial Engineer's headquarters.	Supervisor's head-quarters.
South Arcot	Tanjore	Cuddalore.
Tanjore	Do.	Tanjore.
Trichinopoly ... ... Madura	Do.	Trichinopoly.
Ramnad ... ... Tinnevelly	Do.	Tinnevelly.

Madras Subdivision.

Madras ... ... Chingleput	Industrial Engineer, Madras.	Madras.

Note.—The charge of an Assistant Industrial Engineer is called a division and a charge of a Supervisor is called a subdivision. Every charge takes its name from the headquarters of the officer in charge of it.

IX.—Itinerating Bone-disintegrator.

Large quantities of bones which can advantageously be used for enriching the soil are being wasted or exported from the country every year due to lack of facilities for turning them into bonemeal manure. With a view to supplying this want and enabling ryots to have the bones collected and stored by them disintegrated into meal within a reasonable distance from their villages, the Department of Industries has fitted up a disintegrating unit which will be moved under its own power from one market place or Taluk Headquarters to another such locality, where a sufficient accumulation of bones from one or more ryots is assured. This unit consists of a bone disintegrator mounted on a trolley and a crude oil tractor which will be used for both moving the disintegrator and also for driving it when the unit is stationary.

The ryots will have to pay a hire charge of Rs. 10 per ton of bones crushed. Apart from this charge and the cost of collection of bones plus transport and handling charges of the bone and bonemeal, the ryots have no other expense to incur for obtaining their bonemeal requirements. Ryots who desire to take advantage of this arrangement may apply to the Director of Industries, Post Box No. 432, Chepauk, Madras, stating the quantity of bones collected and available for crushing with them.

X.—Manufacture of White Sugar.

This department will give necessary advice and technical assistance in the construction of furnaces and erection of machinery for manufacturing sugar from sugarcane on a small scale by the open pan system. A limited number of sugar centrifugals, boiling pans, fire bars, etc., are available for lending to ryots who desire to undertake the manufacture of sugar. No hire charges or fees are levied *for the present* for the services rendered by the department; but the ryots will have to meet all incidental expenditure such as transport charges, working expenses, etc.

For further particulars apply to the Director of Industries, Post Box No. 432, Chepauk, Madras.

XI.—Sale of Pinto Chekku on Hire-purchase System.

Elsewhere in this calendar will be found an illustrated account of Pinto chekkus, in popular demand for extracting edible oils. A limited number of these chekkus are available for sale on hire-purchase system.

The price, which is Rs. 550 net, ex-Industrial Engineering Workshops, Washermanpet, Madras, is repayable in ten equal half-yearly instalments, together with interest at $7\frac{1}{2}$ per cent per annum on the outstandings from time to time. The purchaser will have to furnish adequate security and execute an agreement in a form prescribed for the purpose.

For further particulars, apply to the Director of Industries, Post Box No. 432, Chepauk, Madras.

44. State Aid to Industries.

A provision of Rs. 25,000 has been made in the current year's budget for the grant of loans under the State Aid to Industries Act (Act V of 1923) to industries which have an important bearing on the economic development of the country and which are

(*a*) new or nascent industries, or

(*b*) industries to be newly introduced into areas where such industries are undeveloped, or

(*c*) cottage industries.

No loan shall be granted to industrial businesses or enterprises other than those with a capital outlay not exceeding Rs. 1,000 and cottage industries exceeding 50 per cent of the net value of the assets thereof, after deducting existing encumbrances, if any, provided, however, that a loan of an amount not exceeding Rs. 40,000 may be granted even if it exceeds 50 per cent of the value of the assets. The loan sanctioned will be secured by a mortgage or floating charge upon the whole of the assets of the business or enterprise subject to any encumbrances existing at the time of the grant.

In the case of industrial businesses or enterprises with a capital outlay not exceeding Rs. 1,000 and cottage industries, the amount of loan that may be granted will not exceed the value of the security offered and such loan will be secured by

(*a*) a mortgage or floating charge upon the whole of the assets of the business, enterprise or cottage industry, or

(*b*) a mortgage or floating charge upon the assets of the applicant, or

(*c*) a mortgage or floating charge upon the assets of the surety or sureties of the applicant, or

(*d*) the personal security of the applicant or the joint personal security of the applicant and one or more persons, up to the extent of Rs. 500 provided that such security shall ordinarily be taken as collateral security only, or

(*e*) a combination of the forms of the security mentioned above.

The rate of interest at present charged for loans under the Act is $6\frac{1}{2}$ per cent provisional.

Any further information required by intending applicants can be obtained from the Director of Industries, Old Engineering College Buildings, Chepauk, Madras.

45. Note on the Activities of the Textile Section.

The Government Textile Institute, which is the main agency of the Textile Branch of the Department of Industries, is situated on the Kathivakkam High Road close to the Washermanpet tram terminus and

Washermanpet Railway Station. The cotton warp and weft preparation section, wool preparation section, sericulture, silk reeling and silk preparation sections, textile testing section, weaving section, hosiery section and the textile chemistry, dyeing and cloth printing sections are all equipped with modern appliances and machines.

A cotton power spinning section has also been started in the Institute since 1933-34.

Copies of the Prospectus of the Institute can be had of the Principal, Government Textile Institute, Washermanpet, Madras.

46. Note on the Activities of the Sericulture Section.

Government silk farms.—There are four sericultural farms operating in the Presidency where seed cocoons are reared and distributed in Kollegal. Besides, a number of experiments are being conducted in the hybridization of worms with a view to the introduction of a hardy race of silk worms with a better output of silk. The improvement of mulberry is another line of work which the farms are engaged in. The four farms are located in (1) Coonoor, (2) Mathigiri (Hosur), (3) Palmaner, (4) Thadgunni village (Kollegal taluk).

District Work.—With a view to bring suitable areas in the Presidency under sericultural operations, five practical sericulturists have been employed, stationed at the following places: (1) Ellore, (2) Jaggayapet, (3) Vadakangulam, (4) Penukonda, and (5) Kuppam. Besides Kollegal where the industry is carried on as a cottage industry on an intensive scale, successful demonstrations in the planting of mulberry and rearing of silk worms have been made in the following new centres:—

(1) Parts of Tinnevelly district, (2) parts of Chittoor district, (3) parts of Coimbatore district, (4) parts of Kistna district, (5) parts of Chingleput district, (6) parts of Salem district, (7) parts of Anantapur district.

Peripatetic Rearing Party, Kollegal.—A party of five moth testers and one rearer under the supervision of a silk superintendent are stationed in the following centres of Kollegal taluk: (1) Mudigundam, (2) Hallhalli, (3) Kunthur, (4) Surapuram, (5) Palyam, (6) Kamakerai, (7) Kannur. They are concentrating on (1) supply of disease-free-seed to rearers, (2) testing of seed cocoons of rearers under the microscopes in their own homes, (3) educating intelligent rearers in the art of microscopic examination of moths, (4) encouraging the starting of grainages, (5) demonstration of reeling on improved machinery and starting of filatures and cottage silk reeling of improved type, (6) supply of mulberry cuttings and silk worm seeds to several district centres, (7) introduction of green manures in mulberry plantations, and (8) encouragement given to sink wells for irrigating mulberry or plant mulberry in field bunds and introduction of tree saplings in backyard gardens.

In order to increase the number of layings of disease-free seeds for the use of the Kollegal rearers, the Peripatetic Rearing party have been stationed in the important rearing centres and have also been allowed to purchase Mysore seed Cocoons for testing and distribution.

Ericulture.—Ericulture has been successfully introduced in several districts of the Presidency. Since there is no market for cocoons on account of the worldwide trade depression it is advisable to convert the

cocoons into yarn by the departmental spinning wheel or takli and weave the yarn into cloth. The eri silk cloth is strong and durable and is sure to command a good market in the Presidency.

The department has introduced an improved type of spinning wheel for spinning eri cocoons. These wheels have been supplied to most of the Agricultural Farms and Research Stations. An eri spinner is being sent round free of cost for teaching those interested in eri worm rearing and eri spinning.

V.—FISHERIES.

47. The Government Fisheries Training Institute, Calicut.

The Madras Presidency possesses an extensive coastline and the fishing industry on the South and West Coast especially is very productive. **Next to agriculture, fisheries is the most important food-producing industry.** And as a food-producing industry it is specially valuable for two reasons. In the first place the food produced by this industry is rich in proteid or nitrogenous food material, which should be an essential constituent of our diet, but which is largely absent in cereal food such as rice. Secondly this industry is not directly dependent in the same way as agriculture on the monsoons, the failure of which spells famine to the agriculturist. In a predominently agricultural country like India it is very useful to have some Industries independent of the monsoon rains. In addition to food, fisheries produce various other valuable articles like pearls, chanks, fish-oil and fish-guano.

The Fisheries Department tries to introduce new methods and improve existing ones of capture and utilization of fish. But a Government department cannot make much head-way without the enthusiastic co-operation of the people engaged in the industry. Here a serious stumbling block was discovered. The fishermen are educationally a very backward class wedded to all sorts of superstitions and their methods of dealing with fish are very primitive. The spread of education among them was seen to be an essential and antecedent condition for the improvement of the industry. Thus the Madras Fisheries Department was led to take up the task of the education of fishermen.

All educationists recognize that the training given to the child should suit its environment. Hence it is that attempts are being made by the Department of Education to adopt the ordinary elementary school teaching to suit a rural and agricultural life, the great majority of people in our country being rural and agricultural. But the more the ordinary elementary education becomes biased in favour of agriculture, the more it becomes unsuitable for other communities, for example, fishermen, whose manner of life is vastly different from that of agriculturists. Therefore the Fisheries Department had to take up the work of evolving a system of elementary education that would suit fishing communities. The most serious desideratum was the supply of trained teachers who would be able to carry out the work. The Government Fisheries Training Institute, Calicut, was started in 1919 to provide such a supply of specially trained teachers.

The Fisheries Training Institute is mainly a training school for teachers. But the teaching of all subjects is heavily biased in favour of fisheries, for instance, in nature study, emphasis is laid upon the fauna and the flora of the sea and the seashore. The students under training are also made to do practical work at sea for which the Institute is equipped

with three fishing canoes and all the nets used locally. The students spend a part of each term at the Government Fisheries Experimental Station, Tanur, where they learn the various industries related to the utilization of fish, such as fish-curing, smoking, mealing, manufacture of fish-oil and guano, etc. Arrangements have been made for the practical teaching of fish canning, oil and guano manufacture and pisciculture at the Institute from this year forwards. In addition to their ordinary teaching work these fisheries teachers are expected to do rural reconstruction work. Therefore during their training course they are taught the elements of economics, the principles of co-operation, methods of temperance propaganda, etc. For training them in welfare work of a practical nature, a sea rover troop has been organized in the Institute. The students also get a practical training in co-operative work by membership in the school co-operative society which was registered in 1921.

The course is of three years' duration. The students are selected for admission by a committee chiefly composed of non-officials, appointed by the Government. In admitting students preference is shown to members of the fishing communities.

The minimum educational qualification is a pass in the VIII standard or the III Form. Those who have passed the VIII standard or the III Form but who have not completed the high school course get a stipend of Rs. 12 in the first two years and of Rs. 14 in the third year. (The rates of stipends given above have been now temporarily reduced by 25 per cent.) The students are examined at the end of the third year by a Board of Examiners, the president of which is the District Educational Officer, Calicut. The students who pass this examination are recognized by the Education Department as trained teachers of the higher elementary or the secondary grade according to their general education qualifications. **All the students who successfully completed the course have been provided with posts in the Fisheries elementary schools of which there are now 37.**

As the Fisheries Department is maintaining elementary schools only in the two districts of South Kanara and Malabar, only students whose vernacular is either Malayalam or Kanarese are admitted at present. As the Institute is situated in a Malayalam speaking area the Kanarese students undergo two years' ordinary teachers' training in the Government Higher Elementary Training School at Mangalore and then complete their training as Fisheries teachers by undergoing one year's further course at the Institute at Calicut.

48. Shell-grit and Poultry Farming.

Shell-grit is manufactured by powdering shells of molluscs such as the edible oyster, by machinery, into fragments of suitable size.

Experience has shown that, if a small percentage of shell-grit be added to the food of poultry, they not only thrive well but lay eggs with hard healthy shells. To understand this, a brief description of the alimentary tract or gut of the fowl is necessary.

The gut of a fowl consists of several parts. It starts with the mouth and leads into a long and narrow tube which traverses the neck. At the base of the neck, the tube becomes enlarged into a bag called the crop. In the crop, the food which is hurriedly swallowed by the fowl is stored for a time and softened by soaking. When a cock or hen has fed well, the crop gets distended with food and is then visible as a rounded prominence

just where the neck meets the body. The crop in its turn leads into a short tube which enters a wide thick muscular stomach or gizzard with hard horny internal walls. In the gizzard, there are invariably grains of sand and stone which the bird swallows to aid in the mechanical grinding of its food. From the gizzard a long much-coiled tube, viz., the intestine arises which forms the greater portion of the gut and lies in the abdomen along with other organs.

Now, birds have no teeth and therefore they cannot chew their food as we can. The domestic fowl, quail, peacock and similar birds, which live for the most part on hard grain and seed, have a very thick muscular gizzard or stomach which, as we have seen, in addition to food, contains stones and grit. During the muscular contractions of the stomach these stones help that organ in grinding up the hard food of these birds into a soft pulp; that is to say, they take the place of teeth in other animals.

Domestic fowl carefully brought up in farms or pens often suffer from a deficiency of grit with the food. Besides assisting, in the first instance, in grinding the food and making it suitable for digestion and assimilation in the intestines, oyster-grit or shell-grit serves another important purpose. During the process of grinding, the shell-grit being composed of lime, is itself ground up to a certain extent and gets mixed with the food. Thus along with the nourishing material of the food a certain amount of lime is also absorbed by the intestines.

Now all birds lay eggs which have a protective covering of lime known as shell. The hardness of the shell depends on the quantity of lime present. If there is not enough lime in the covering, soft-shelled eggs are the result. As poultry breeders are aware, domestic fowls often suffer from this malady. Eggs with soft shells are unsightly and not marketable. They are difficult to incubate. **Oyster-grit in the food provides sufficient lime and prevents soft-shelled eggs effectively.**

Price F.O.R. Ennore (near Madras), M. & S.M. Ry., 80 lb., Rs. 4-4-0; 60 lb., Rs. 3-4-0; 40 lb., Rs. 2-4-0; 20 lb., Re. 1-4-0.

If a small quantity of shell-grit is put into a trough or "hopper" and placed in the poultry house, the fowls will help themselves.

As railway freight per passengers train will be high, it is better to order in maund lots per goods train. **The Madras Fisheries Department manufactures oyster-grit which is cheaper than any imported and many of the large poultry farms throughout India and Burma purchase their requirements from the Fisheries Station, Ennore, Madras.**

All communications should be addressed to the Research Assistant, Government Fisheries Station, Ennore.

VI.—PUBLIC HEALTH.

49. The Borehole Latrine will solve an Important Problem in Rural Sanitation.

Sanitary conditions in India, where the vast majority of the population live in rural areas, are still in a very primitive stage—in spite of the great advances made in many other countries in the application of a scientific mode of living. Most of our villages receive little in the way of sanitary attention. Rubbish and manure heaps and human or animal excreta are

in evidence almost everywhere. Provision of protected water-supplies, efficient drainage and prompt removal of refuse and excreta from human habitation are the fundamentals for any sanitary or health improvement. Suitable latrines and safe methods of sullage disposal are seldom met with. The custom for each individual to deposit his excreta in places where it is likely to be a nuisance or where it is liable to get into the public water-supply or, through flies, to be transferred to the food. These conditions prevail firstly because the ordinary person has no sense of sanitation or of his responsibility to his neighbours, and secondly because the necessary facilities are wanting.

Lack of provision of a sufficient number of clean latrines for the use of the people in the villages is the cause of the promiscuous pollution of fields, the banks of streams, streets, lanes, hedges, quiet corners surrounded by prickly-pear and every other conceivable place. Pollution of the soil with human excreta constitutes a public health problem of great magnitude in our villages. It is one of the chief ways by which dangerous diseases are spread from one person to another. Enteric fever is very frequently conveyed in this way, so also are cholera and dysentery and other bowel complaints. Hookworm infection, which is widely prevalent, is entirely due to soil pollution.

This polluted soil with the disease germs it may contain, is very liable to be carried by flies to food and by rains into the wells, streams or tanks. Pigs, fowls, and other animals may also spread filth. It is, therefore, very important that as many latrines as are necessary should be provided in each village, and by means of intensive propaganda, the villagers should be encouraged to go to them for the calls of nature.

The greatest impediment to the provision of sufficient latrine accommodation in villages was the enormous cost involved in the construction of the usual types of latrines. To overcome this difficulty, a new type of latrine has now been devised, which is cheap, highly efficient, and easy to construct and which requires minimum attention. This is the **Borehole latrine.**

The borehole latrine consists of a circular hole 14 inches in diameter bored from 10 to 20 feet into the ground. A reinforced concrete squatting slab (2½ feet by 2½ feet) is placed over the hole and an enclosure 5 to 6 feet high is constructed round it. The enclosure may be of mud walls, tarred bamboo thatties or corrugated iron sheets. The corrugated iron sheet enclosures will certainly look smarter and cleaner and is more economical in the long run. The holes are bored into the earth by means of special earth boring tools. In an earth of average hardness, three men are required to work the boring tool and takes them about a day and a half to bore a hole of 15 feet deep. The borers can be bought outright or hired for a nominal sum from the Office of the Director of Public Health, Madras.

The cost of constructing a borehole latrine is largely governed by the cost of the squatting slab and the cost of labour required for the boring. When a large number of borehole latrines are to be constructed in one district it would be more economical to construct reinforced concrete squatting slabs locally as the cost would thereby be considerably reduced. The cost of the boring depends upon the quality of tool used, the hardness of the soil, the skill and experience of the labour employed and the extent of supervision. On an average, the squatting slab costs Rs. 3 each, and the labour for boring a hole of 15 feet costs about Rs. 2.

When the latrine fills up to within 2 feet of the ground level, the borehole should be filled up with dry earth, and the squatting slab removed and placed over a fresh boring made a little distance away. The enclosure can be shifted to this and the new latrine will be ready for use. The squatting slabs can be used over and over again, the cost of reconstruction being limited to the cost of making new borings. This is negligible compared with the interest on capital cost and maintenance charges of the usual type of masonry latrines. After allowing a used pit to ripen for six months, it may be bored out again for use as a latrine and the material removed can be used as a valuable manure. With average use, a borehole latrine will get filled up only in one or two years.

An important fact to be remembered in connexion with the use of borehole latrines is that it is only an ideal latrine if it is properly used. The villager should sit correctly over the aperture provided for the purpose and not use the vicinity, entrance passages and the compartments themselves except in the proper manner. The misuse of the latrine in these directions is one of the greatest handicaps to its popularity, as such misuse renders the latrine objectionable to others. The borehole latrine has been designed to minimize the possibility of misuse by reducing as much as possible the width of passages, the size of the squatting plate and the spare area within the latrine. The rest must be left to public opinion, and to propaganda by enlightened persons who are interested in rural prosperity and welfare.

50. Hookworm Disease.

Some villagers appear to be more energetic than others. They seem to be able to work longer, they do not tire easily and they have an interested outlook on life, they are able to earn good money and enjoy it. Have you ever considered that these lucky few probably represent those who have escaped from the results of hookworm disease? The hookworm sucks the blood of his victim, slowly poison him and make him gradually a complete wreck. Though they may not kill him outright, they undermine his vitality to such an extent that he falls a ready prey to other fatal diseases.

The hookworm is about one-third to half an inch in length and is as thick as an ordinary pin. It has sharp hook-like teeth with which it sticks on to the inner wall of the bowels. The mature female worm lays over a thousand eggs per day. These eggs are passed out with the fæces. When the excreta with the eggs are deposited on moist, warm soil, larval hookworm hatch out from the eggs. These tiny worms after a period of development bore through the skin and enter the human body. Those who walk barefooted through polluted soil or dig pits or handle the soil in any other way are those that usually become infected. Generally the larvae pierce the soft skin between the toes. In places where they have penetrated through the skin, there may be an itching sensation, with subsequent formation of ulcers. This is called "ground itch." Having entered the body, these tiny worms are carried by the blood-stream through a circuitous route to the bowels where they live and thrive. On reaching maturity the female worms begin to lay eggs which pass out and the cycle is again repeated. Thus infection, soil pollution, and re-infection go on in a vicious circle for ever.

The effect of hookworm infection on an individual will vary with the number of worms present in his bowels and the circumstances under which

he lives. Some may have several worms in their bowels without showing any signs of it. Others may have a few worms with very serious symptoms. A mild infection may produce only a slight paleness with weakness of body and mind. Vague abdominal pains, headache, dizziness, occasional digestive troubles and abnormal cravings to eat such things as clay, sand, paper, ashes, etc., are all the various manifestations of the disease. A severe case may have swelling of the legs and feet, emaciation, extreme pallor, puffy stupid appearance, extreme weakness, protruberant abdomen, etc. In the case of pregnant women, abortion may take place.

Infestation with hookworm reduces the working capacity of individuals and this is very serious from an economic point of view. In children, their growth and development are seriously retarded. They become very anæmic and unable to stand any mental and physical exertion. Their intellect is dulled and they lose their youthful enthusiasm and energy. In short they are prevented from rising to full manhood or womanhood, both physically and mentally.

The disease can be readily diagnosed, treated and cured. Eggs in fæces can be detected by microscopical examination which is conclusive evidence for the presence of the worms in the bowels. There are several very efficient drugs which will kill these worms in the bowels and expel them. One dose is often enough. Free treatment for hookworm disease will be given in all Government and Local Fund Hospitals and Dispensaries. If you are a sufferer why do you not avail yourself of it? It will make you healthier and happier.

When once you are cured, reinfection should be prevented. Reinfection is possible only if soil pollution is allowed to continue. Indiscriminate defæcation in open places should be stopped. Teach your neighbours that they should not ease themselves anywhere and everywhere. Soil pollution is responsible for the spread of hookworm disease, cholera, typhoid, dysentery and diarrhœa. Why then continue this harmful old practice? Provide latrines in your villages and resort to them for calls of nature. It will keep your village clean and prevent you from many dangerous diseases.

51. Cholera.

Cholera is a deadly disease which kills thousands of people every year. It is caused by a minute germ called cholera vibrio. Millions of these cholera germs are passed in the motions and vomit of a cholera patient. That is why the disease spreads widely and rapidly when once it is introduced into a village. The germs enter the human body to do their deadly work only through our food and drink. A man will not get cholera unless he eats infected food or drinks water contaminated by cholera excreta.

It is easy to escape cholera, if the following simple precautions are taken :—

(1) Where no protected water-supply is available, drink only boiled water. Boiling kills the cholera germs. Water for other domestic purposes should be taken only from sources which are least liable to be contaminated.

(2) Protect your food from flies and dust by keeping them properly covered up. Flies carry filth and dangerous germs on their legs and wings from the latrines and manure heaps. When they sit on your food, this filth is also deposited on it.

(3) Get yourself and your family inoculated against cholera every year before the commencement of the usual cholera season. Inoculation gives you a good chance of escape from cholera.

(4) Do not take purgatives or eat over-ripe or unripe fruits when there is cholera in the village. These will irritate your bowels and predispose you to cholera infection.

(5) If any one gets cholera, call the doctor immediately. Delay is dangerous. The earlier the treatment the greater the chances of recovery.

(6) Keep the cholera patient in a separate room or verandah. Only one or two people should attend on him. The clothing and vessels of the patient should be kept separately, and should not be used by others until they are thoroughly disinfected.

(7) Burn the vomit and excreta of the cholera patient as they contain the germs of cholera. Mix them with saw dust or straw, pour kerosene oil on them and burn them. His clothing should be disinfected by boiling or by immersing for an hour in a strong disinfectant lotion before it is given for washing to the dhoby.

(8) Do not wash the clothing and utensils of the cholera patient near tanks, wells, or rivers. If you do so, you infect the water and any other person drinking that water may get cholera.

(9) Wash your hands well with soap and water after attending on a cholera patient. Your nails may harbour cholera germs. Clean them well. If you have a disinfecting lotion wash your hands with it.

(10) Inform the village munsif or the health inspector of all cases of cholera. They will give you every assistance in stamping out the disease from the village.

(11) Chlorinate your wells and tanks every day till the village is free from cholera. Never use river or channel water.

52. Malaria and Mosquitoes.

Malaria is caused by the bites of certain kinds of mosquitoes. It is impossible to get malaria in any other way. A person suffering from the complaint has malaria germs in his blood in large numbers. The mosquito while biting him swallows these germs along with the blood. The germs grow in the mosquito and subsequently when it bites a healthy person it transfers the malaria germs to him. Elephantiasis and dengue fever are also caused by the bite of mosquitoes. Without mosquitoes, these diseases will not spread.

It is only in collections of water that mosquitoes can breed. The female mosquito lays hundreds of eggs in water. In a day or two, tiny wormlike larvae hatch out from these eggs and wriggle about actively. In a short time, they assume a different shape called pupa from which adult mosquitoes finally emerge. It takes from 7 to 10 days for the mosquitoes to mature from the egg. Any stagnant water, whether clean or dirty, is enough for mosquitoes to breed. Such collections of water are very common in broken pots, bottles, barrels, troughs, holes, pits, puddles, ditches, etc.

The spread of malaria depends on the following three factors :—

(1) The malarial parasite present in the blood of the sufferer from malaria.

(2) The special variety of mosquito which carries these germs from the malarial patient to the healthy man.

(3) Facilities for the mosquitoes to bite man.

Any attempt to stamp out malaria should be directed against these factors. It is not a tall at difficult problem, if properly tackled. Adopt the following simple measures and escape malaria :—

(1) Quinine is a powerful drug which will kill malarial parasites. Those who suffer from malaria should take sufficient quinine to kill the germs in their blood. Consult the nearest doctor. He will advise you. By proper treatment with quinine, you will be cured of malaria and you will no longer be a danger to others. Quinine is available in the nearest Post Office.

(2) Prevent mosquitoes breeding in or near your house. Mosquitoes breed only in places where there is water. Fill up small ponds and pools, keep your drains and ditches in good order, and empty the broken pots, bottles, barrels, etc., in your compound. Such water courses, that cannot be filled up or emptied, should be oiled once a week to kill the mosquito larvae. By spreading a thin film of kerosene oil on the surface of the water, the mosquito larvae are prevented from breeding and they die.

(3) Mosquito bites are annoying and irritating even if they do not always cause diseases. Prevent mosquitoes biting you by sleeping under mosquito curtains.

53. Smallpox.

Many of you are familiar with smallpox. It is an acute contagious disease which begins with chills, fever, headache and pains all over the body. After three days of fever, the characteristic shots appear on the face and hands and gradually spread. In severe cases, these pocks may run together and become big ulcers.

Smallpox is a terrible disease which is responsible for several thousands of deaths in this country. Those who are fortunate enough to escape death, may become badly disfigured for life, or may lose their eye-sight for ever.

Smallpox is carried from the infected individual to others through the air. It sticks to clothing and bedding of infected persons and so persons handling these articles are liable to catch the disease. Those attending on a patient or even living in the same house with him run similar risk. That is why, in olden days when the means of avoiding smallpox were not known, few escaped this horrible disease when once it appeared in a village.

Smallpox has lost its terrors now. It is easily avoided by getting vaccinated. Vaccination is the surest protection against smallpox. Before the days of vaccination, nearly everybody had smallpox once in their lifetime. You can escape smallpox to-day if you protect yourself by vaccination. The disease attacks only those who neglect vaccination.

Vaccination is done by applying a tiny drop of calf lymph to a small scratch on the arm. In a few days, a small vesicle develops at that point which, if kept clean and undisturbed, heals off easily leaving a very small scar.

A child should be vaccinated when it is three to six months old. The protection conferred by the first vaccination wears off in course of time. Re-vaccination should, therefore, be done once in every ten years. It is also a safe plan to get one-self re-vaccinated whenever there is an epidemic of smallpox in the village. It does not cause you any harm but it makes your protection from smallpox certain.

54. Plague.

Plague is one of the deadliest infectious diseases that may come to villages as epidemic visitations from time to time. It is distinct from other epidemic diseases in the fact that it attacks both men and rats. Dead rats are the first signs of the outbreak of plague in any locality.

Plague is caused by a micro-organizm called plague bacillus. The blood and the internal organs of an infected rat or man will be swarming with these germs. Tiny insect lives on the fur of rats and are called rat fleas. These feed on the rat's blood. When a rat gets plague and dies, the fleas on it will immediately leave the dead rat and jump on to other rats or men. The plague germs are thus conveyed from infected rats to healthy rats or human beings. No epidemic of plague is possible without rats and rat-fleas. Our villages abound in rats and so it is no wonder that when plague is once introduced, it flares up easily and spreads widely. Rats are of no use to us. They live on our grains and consume our food. The consequent economic loss to the community is considerable. Why not destroy this pest and escape plague epidemics?

You can protect your village from an outbreak of plague if the following precautions are taken :—

1. Infected rat-fleas are carried from village to village on consignments of grains and other foodstuffs and on the personal effects of persons running away from the infected village on account of plague scare. Do not allow anybody from an infected village to come to your village till he is thoroughly disinfected. No baggage or consignments of grains should be admitted without thorough sun disinfection.

2. Carry on vigorously a rat-destruction campaign. Kill all rats. Without rats, plague will not occur in your village.

3. Clean up the village and particularly your houses and surroundings. Remove all lumber and rags. Rats breed in these. Keep the grains and foodstuffs covered. Do not allow any garbage or refuse to lie about the house or compound. Rats thrive on rubbish.

4. Construct rat-proof granaries and godowns.

5. Get yourself and your family inoculated against plague before the usual plague season. Inoculation gives you immunity from plague.

6. Inform the village headman or the health inspector whenever you see dead rats lying about the village or there are suspicious cases of fever.

7. If any case of plague occurs in the village, remove him at once to the isolation hospital where he will be properly taken care of.

8. Dead rats are the first warning that a particular house is infected. Vacate it at once. It will be courting disaster if you persist in living in that house. Go and live in the special health camp provided for you. You will have every convenience there.

9. Do not return to your house till it is declared free from infection by the health authorities. They will clean and disinfect your house, destroy all rats and fleas in it and make it safe for you to return.

10. Most important of all. Do not get scared—carry out the above instructions and you can easily save yourself and your neighbours.

VII.—MISCELLANEOUS.

55. List showing Weekly Cattle Fairs held in the Several Districts of the Madras Presidency.

District. (1)	Taluk. (2)	Village in which cattle fair is held. (3)	Day on which weekly cattle fair is held. (4)	Nearest railway station. (5)
Arcot, North.	Wallajah ...	Ranipet ...	Every Friday ...	Ranipet.
	Wandiwash.	Mazhayur ...	,, do. ...	Polur.
	Do.	Thellar ...	,, Thursday ...	Tindivanam.
	Cheyyar ...	Purisai ...	,, Sunday ...	Conjeeveram.
	Do. ...	Tiruvettipuram.	,, Monday ..	Do.
	Do. ...	Kuzhamandal ...	,, Wednesday ...	Do.
	Arni ...	Arni	,, Sunday ...	Arni road.
	Do. ...	Devikapuram ...	,, Tuesday ...	Polur.
	Do. ...	Onnupuram ...	,, Thursday ...	Onnupuram.
	Gudiyattam.	Latteri	,, Sunday ...	Latteri.
	Do.	Vaduganthangal.	,, Wednesday ...	Virinchipuram.
	Do.	Pernampet ...	,, Monday ...	Mailpatti.
	Do.	Gudiyattam ..	,, Tuesday ...	Gudiyattam.
	Vellore ...	Pennathur ...	,, Wednesday ...	Pennathur.
	Polur ...	Wadamadimangalam.	,, Monday ...	Madimangalam.
	Do. ...	Kalasapakkam ...	,, Friday ...	Kalasapakkam.
	Do. ...	Padavedu ...	,, do. ...	Arni road.
	Tiruppattur.	Matrapalli ...	,, Tuesday ...	Tirupattur.
	Do. ..	Pudupet ...	,, Thursday ...	Pudupet.
	Do. ...	Jalarpet	,, Wednesday ..	Jalarpet.
Arcot, South.	Cuddalore.	Valayakarankuppam.	,, Friday ...	Melpattambakkam.
	Do.	Kullanchavadi ...	,, Sunday ..	Kullanchavadi.
	Do.	Konamangalam.	,, Monday ...	Nellikuppam.
	Do.	Karunguli ...	,, Thursday ..	Kurinjippadi.
	Do.	Kurinjippadi ...	,, Monday ...	Do.
	Do.	Karamanikuppam.	,, do. ...	Varagalpattu.
	Kallakurchi.	Rishivandiyam.	,, Thursday ...	Tirukkoyilur.
	Chidambaram.	Bhuvanagiri ...	,, Friday ...	Chidambaram.
	Do.	Vallampadugai.	,, Monday ...	Do.
	Vriddhachalam.	Pennadam ...	,, Tuesday (during April to July).	Pennadam.
	Do.	Kattuparur ...	,, Thursday ...	Puvanur.
	Villupuram.	Radhapuram ...	,, Monday ...	Mundiyambakkam.
	Do.	Muttathur ...	,, Tuesday ...	Perani.
	Do.	Panchamadevi ...	,, Thursday ...	Serndanur.
	Do.	Kidar ...	,, do. ...	Mambalapattu.
	Gingee ...	Chettipalaiyam.	,, Friday ...	Tindivanam.
	Do. ...	Valathi ..	,, Sunday ...	Do.
	Tindivanam.	Kutteripattu ..	,, do. ...	Mailam.
	Do.	Ongur	,, Tuesday ...	Tholupedu.
Chittoor ...	Palmaner...	Palmaner ..	,, Friday ...	Chittoor (25 miles).
Chingleput.	Conjeeveram	Walajabad ...	,, Monday ...	Walajabad.
	Do.	Conjeeveram ...	,, Sunday ...	Conjeeveram.

55. List showing Weekly Cattle Fairs held in the Several Districts of the Madras Presidency—*cont.*

District. (1)	Taluk. (2)	Village in which cattle fair is held. (3)	Day on which weekly cattle fair is held. (4)	Nearest railway station. (5)
Chingleput—*cont.*	Chingleput ..	Singaperumalkoil.	Every Wednesday ...	Singaperumal-koil.
	Maduranta-kam.	Acharapakkam ...	„ Sunday ...	Acharapakkam.
	Do.	Anaicut	„ Friday ...	Madurantakam.
	Saidapet ...	Pallavaram ...	„ do. ...	Pallavaram.
Coimbatore.	Avanashi ...	Annur ...	„ Saturday ...	Somanur.
	Bhavani ...	Andiyur ...	„ Monday ...	Erode.
	Do. ...	Budapadi ...	„ Tuesday ...	Do.
	Do. ...	Kavandapadi ...	„ Wednesday ...	Do.
	Do. ...	Kolattur ...	„ Friday ...	Do.
	Do. ...	Mylambadi ...	„ Saturday ...	Do.
	Coimbatore.	Coimbatore ..	„ Sunday ...	Coimbatore.
	Do.	Vellalore ...	„ Tuesday ...	Podanur.
	Do.	Tudiyalur ...	„ Monday ...	Tudiyalur.
	Do.	Koilpalaiyam ...	„ Wednesday ...	Coimbatore.
	Gobichetti-palaiyam.	Punjaipuliam-patti.	„ Thursday ...	Vanjipalaiyam.
	Do.	Siruvalur ...	„ Tuesday ...	Perundurai.
	Do.	Modachur ...	„ Saturday ...	Uthukuli.
Ganjām ...	Narayana-peta.	Narayanavalasa.	„ Thursday ...	Tirlaru.
	Parlakimedi.	Uppalada ...	„ Sunday ...	Parlakimedi.
	Do.	Balada ...	„ Thursday ...	Varnasi.
	Do.	Parlakimedi ...	„ Saturday ...	Parlakimedi.
	Ghumsur ...	Bellugunta ...	„ Monday ...	Berhampur (55 miles).
	Udayagiri ...	Tikkaballi ..	„ Friday ...	Berhampur.
	Do. ...	Raika	„ Thursday ...	Do.
	Parlakimedi.	Aarvakota ...	„ do. ...	Tilaru.
	Do	Kosamala ...	„ do. ...	Parlakimedi.
	Do.	Temburu ...	„ do. ...	Temburu.
	Chicacole ...	Amidalavalsa ...	„ Saturday ...	Chicacole road.
	Do ...	Chintada ...	„ do. ...	Chicacole road (2½ miles).
	Chatrapur ...	Narandrapur ...	„ Wednesday ...	Jagannadhapur (2 furlongs).
	G. Udaya-giri.	G. Udayagiri ...	„ Saturday ...	Berhampur (77 miles).
	Do.	Guttingia ...	„ Thursday ...	Berhampur (92 miles).
	Balliguda ...	Balliguda ...	„ Saturday ...	Berhampur (120 miles).
	Do. ...	Korjamendi ...	„ Sunday ...	Berhampur.
	Do. ...	Kotgarh ...	„ Tuesday ...	Muniguda.
	R. Udaya-giri.	Chelligodo ...	„ Wednesday ...	Parlakimedi.
	Chicacole ...	Gara	„ Tuesday ...	Chicacole road (8 miles).
	Do. ...	Saribujjili ...	„ Friday ...	Chicacole road (11 miles).

55. List showing Weekly Cattle Fairs held in the Several Districts of the Madras Presidency—*cont.*

District. (1)	Taluk. (2)	Village in which cattle fair is held. (3)	Day on which weekly cattle fair is held. (4)	Nearest railway station. (5)
Gōdāvari, East.	Ramachandrapuram.	Alamur	Every Tuesday ...	Dwarapudi.
	Do.	Dwarapudi ...	,, Wednesday ...	Do.
	Do.	Draksharama ...	,, Monday ...	Draksharama.
	Amalapuram.	Ambajipeta ...	,, Wednesday ...	Kotipalli.
	Peddapuram.	Jaggampeta (near Talluru).	,, Monday ...	Samalkot.
	Do.	Yeleswaram ...	,, Thursday ...	Do.
	Pithapuram.	Pithapuram ...	,, Saturday ...	Pithapuram.
	Tuni ...	Tuni ...	,, Sunday ...	Tuni.
Gōdāvari, West.	Narasapur ...	Palakole ...	,, Saturday ...	Palakole.
	Tadepalligudem.	Tadepalligudem.	,, Sunday ...	Tadepalligudem.
	Bhimavaram.	Undi	,, Tuesday ...	Undi.
	Do.	Bhimavaram ...	,, Wednesday ...	Bhimavaram.
Kistna ...	Kaikalur ...	Kaikalur ...	,, Saturday (in the months of June and August).	Kaikalur.
Madura ...	Palni ...	Virupakshi ...	,, Thursday ...	Oddanchatram (3 miles).
	Tirumangalam.	Usilampatti ...	,, Wednesday ...	Usilampatti.
	Periyakulam.	Theni ...	,, Sunday ...	Theni.
	Melur ...	Melur	,, Monday ...	Madura (19 miles).
Malabar ...	Walluvanad.	Vaniyamkulam ...	,, Thursday ...	Ottappalem (4 miles).
	Do.	Perur Amsom, Pathiripala Cattle Fair.	,, Sunday ...	Lakkidi.
	Ponnani ...	Manthala Amsom, Kutingal Shandy.	,, Wednesday ...	Pattambi.
Salem ...	Hosur ...	Kelamangalam ...	,, Sunday ...	Kelamangalam.
	Dharmapuri division.	Kambainallur ...	,, Friday ...	Do.
	Do.	Kadathur ...	,, Sunday ...	Do.
	Salem ...	Namamalai ...	,, do. ...	Salem Town.
	Sankaridrug.	Maniyanur ...	,, do. ...	Sankaridrug.
	Dharmapuri division.	Sankamuniyappan Koil of Pallipalaiyam.	,, Monday ...	Sankaridrug (7 miles).
	Do.	Pallipalaiyam ...	,, Wednesday ...	Cauvery (2 miles).
	Do.	Yedappadi ...	,, do. ...	McDonald's choultry (11 miles).
	Do.	Kolikkal Natham of Rajapalaiyam.	,, Saturday ...	Sankaridrug (3 miles).

55. List showing Weekly Cattle Fairs held in the Several Districts of the Madras Presidency—*cont.*

District. (1)	Taluk. (2)	Village in which cattle fair is held. (3)	Day on which weekly cattle fair is held. (4)	Nearest railway station. (5)
Tanjore ...	Tanjore ...	Orattanad ...	Every Saturday ...	Tanjore (14 miles).
	Shiyali ...	Kuthiyampettai.	,, Monday ...	Coleroon (1 mile).
	Do. ...	Taikal (hamlet of Tirumailadi).	,, do. ...	Do.
	Pattukkottai.	Pattukkottai ...	,, do. ...	Pattukkōttai.
	Do.	Peravurni ...	,, Sunday ...	Peravurni.
	Arantangi.	Arantangi ...	,, Tuesday ...	Arantangi.
	Mannargudi.	Neduvakottai ...	,, do. ...	Haridranathi (1½ miles).
Tinnevelly ...	Tinnevelly.	Kodaganallur ...	,, Sunday ...	Melakallur.
Trichinopoly.	Kulittalai ...	Manapparai ...	,, Wednesday ...	Manapparai.
	Udaiyar-palaiyam.	Ariyalur ...	,, Sunday ...	Ariyalur (4 furlongs).
	Karur ...	Paramathi ...	,, Tuesday ...	Noyyal (8 miles).
	Do. ...	Uppidamangalam.	,, Sunday ...	Puliyur (3 miles).
	Do. ...	Mayanur ...	,, Monday ...	Mayanur.
	Do. ...	Kosur ...	,, Thursday ...	Manapparai.
	Do. ...	Thogamalai ...	,, Friday ...	Do.
	Do. ...	Erumbothipatti...	,, Saturday ...	Kulittalai.
	Do.	Ariyavur ...	,, Sunday ...	Pungudi.
	Do. ...	Nagamangalam.	,, Thursday ...	Do.
Vizagapatam.	Golgonda ...	Kottakota ...	,, Saturday ...	Narasapatam road.
	Do. ...	Kota Uratla ...	,, do. ...	Do.
	Do. ...	Rolugunta ...	,, Thursday ...	Do.
	Do. ...	Buchimpeta ...	,, Monday ...	Do.
	Do. ...	Chidigummala ...	,, Sunday ...	Do.
	Do. ...	Narasapatam ...	,, Saturday ...	Do.
	Do. ...	Vemulapudi ...	,, Wednesday ...	Do.
	Do. ...	Makarapalem ...	,, Tuesday ...	Do.
	Sarvasiddhi.	Nakkapalli ...	,, Wednesday ...	Do.
	Do.	Rayavaram ...	,, Monday ...	Regupalem.
	Do.	Yellamanchili ...	,, Thursday ...	Yellamanchili.
	Viravalli ...	Waddadi ...	,, Sunday ...	Anakapalle.
	Do. ...	Pakirsahibpeta ..	,, Tuesday ...	Do.
	Do. ...	Timiram ...	,, Friday ...	Do.
	Do. ...	Madgole ...	,, Monday ...	Do.
	Do. ...	Medivada ...	,, Tuesday ...	Do.
	Srungavara-pukota.	Alamanda ...	,, Monday ...	Alamanda.
	Do.	Kottavalasa ...	,, Tuesday ...	Kottavalasa.
	Chipurupalli.	Nimmalavalasa.	,, Sunday ...	Sigadam.
	Do.	Ravada	,, Wednesday ...	Chipurupalli.
	Palkonda ...	Ungarada ...	,, do. ...	Do.
	Do. ..	Razam	,, Thursday ...	Do.
	Bobbili ...	Baligipeta ...	,, Friday ...	Bobbili.
	Do. ...	Vantravilli ...	,, Sunday ...	Donkinavalasa.
	Do. ...	Komatipalli Agram near Manapuram.	,, Saturday ...	Komatipalli.

55. List showing Weekly Cattle Fairs held in the Several Districts of the Madras Presidency—*cont.*

District. (1)	Taluk. (2)	Village in which cattle fair is held. (3)	Day on which weekly cattle fair is held. (4)	Nearest railway station. (5)
Vizagapatam —*cont.*	Salur ...	Salur	Every Saturday ...	Salur.
	Do. ...	Pedapadam ...	,, Wednesday ...	Do.
	Nowrangapur.	Hattoborandi ...	,, Monday ...	Dhamteri.
	Do.	Nowrangapur ...	,, do. ...	Salur.
	Do.	Tentulikunta ...	,, do. ...	Do.
	Do.	Kottagam ...	,, Tuesday ...	Do.
	Do.	Mohara ...	,, Wednesday ...	Dhamteri.
	Pottanghi ...	Soguru ...	,, Friday ...	Salur.
	Do. ...	Limgiri ...	,, Sunday ...	Do.
	Do. ...	Dumuripet ...	,, Saturday ...	Do.
	Malkanagiri.	Mondiguda ...	,, Sunday ...	Do.
	Do.	Bujjaguda ...	,, Saturday ...	Do.
	Vizianagram.	Vizianagram ...	,, Sunday ...	Vizianagram.
	Do.	Pedatharini ...	,, Monday ...	Gujjangivalasa.
	Jeypore ...	Cheptomba ...	,, Thursday ...	Salur.
	Do. ...	Bedoambada ...	,, Monday ...	Do.
	Do. ...	Dasamantapur ...	,, Wednesday ...	Do.
	Do. ...	Bobia	,, Saturday ...	Do.
	Anakapalle.	Tummapala ...	,, do. ...	Anakapalle.
	Gunupur ...	Bhanini ...	,, do. ...	Gunupur.
	Anakapalle.	Tallapallam ...	,, Monday ...	Bayyavaram.
	Do.	Tummapala ...	,, Saturday ...	Anakapalle.
	Do.	Paravada ...	,, Tuesday ...	Duvvada.
	Koraput ...	Dummuriput ...	,, Saturday ...	Salur.
	Vizianagram.	Manapuram ...	,, do. ...	Komatipalli.
	Salur ...	Pachipenta ...	,, Thursday ...	Salur.
	Do. ...	Thonam ...	,, Saturday ...	Do.
	Do. ...	Duggeru ...	,, Thursday ...	Do.
	Rayaghada.	Sasikhellu ...	,, Saturday ...	Judipeta.

56. List showing the available Publications of the Agricultural Department, Madras.

SECTION A.

AGRICULTURAL DEPARTMENT.

I.—FREE PUBLICATIONS.

A.—Broad Hints for Everyday Use.

Number and subject.	Author.	Languages published.	Year of publication.
1. Feed your bullock	G. R. Hilson ...	English, Telugu, Tamil, Malayalam and Kanarese.	1930

I.—FREE PUBLICATIONS—*cont.*

A.—Broad Hints for Everyday Use—*cont.*

Number and subject.	Author.	Languages published.	Year of publication.
2. Feed your cow	R. W. Littlewood...	English Telugu, Tamil, Malayalam and Kanarese.	1930
3. Plough early	D. Ananda Rao ...	Do.	1931
4. Plough efficiently	Do. ...	Do.	1931
5. Sow good seed	G. R. Hilson ...	Do.	1931
6. Beware of weeds	Do. ...	Do.	1931
7. Feed and work your cow ...	R. W. Littlewood.	Do.	1932
8. Dedication of breeding bulls of Ongole breed.	Do.	Do.	1932

B.—Pamphlets.

1. Cultivation and management of grass land at the Livestock Research Station, Hosur.	R. W. Littlewood.	English	1930
2. Results of experiments conducted at the Agricultural Research Station, Palur.	D. Ananda Rao ...	Do.	1930
3. Notes on the result of Chemical, Entomological and Mycological Experiments conducted at the Betelvine Research Station, Vellalur, during 1925-30.	B. Viswanath, Y. Ramachandra Rao and S. Sundararaman.	English, Telugu, Tamil, Malayalam and Kanarese.	1931
4. Useful information obtained from ten years' work (1920-29) on the Agricultural Research Station, Samalkota.	G. Jogi Raju ...	English	1931
5. Some common insecticides.	T. V. Ramakrishna Ayyar.	English, Tamil, Telugu, Malayalam and Kanarese.	1931
6. Insects affecting paddy plant in South India.	Do.	Tamil and Telugu (Kanarese and Malayalam under print).	1933

C.—Notes.

1. Note on pure paddy seed: VIII Circle.	R. C. Broadfoot ...	English and Tamil.	1931
2. Note on pure paddy seed: I Circle.	A. C. Edmonds ...	English and Telugu.	1931
3. Note on pure paddy seed: VI Circle.	B. Ramayya ...	English and Tamil.	1931

I.—FREE PUBLICATIONS—*cont.*

C.—Notes—*cont.*

Number and subject.	Author.	Languages published.	Year of publication.
4. Some suggestions to the ryots of the IV Circle, to obtain and keep paddy seed pure.	M. Govindakidavu.	English, Tamil and Telugu.	1931
5. Note on ragi silage in Coimbatore district.	K. Gopalakrishna Raju.	English, Tamil, Telugu, Malayalam and Kanarese.	1931
6. Hints to the ryots of Trichinopoly and Tanjore districts in keeping up the purity of paddy seeds.	N. S. Kulandaiswami Pillai.	English and Tamil.	1931
7. Pure paddy seed : II Circle.	D. Balakrishnamurti.	English and Telugu.	1931
8. Pure paddy seed : VII circle.	K. T. Alwa ...	English, Malayalam and Kanarese.	1932
9. How to save temples and costly buildings from destruction.	S. Sundararaman ...	English	1932
10. Maintenance and preservation of pure paddy seed in the Ceded district.	K. T. Alwa ...	English and Kanarese (Telugu under print).	1933
11. Note on Panama disease of plantations.	S. Sundararama Ayyar.	English	1933

D.—Leaflets.

1 Breeding and rearing of cattle and buffaloes.	R. W. Littlewood ...	English, Telugu, Tamil, Kanarese and Malayalam.	1929
2. Conditions to be fulfilled for the grant of premium for breeding bulls.	......	Do.	1929
3. Rations for milch cows, dry cows and calves.	......	Do.	1930
4. The preparation in home of infant and invalid foods from cholam.	B. Viswanath ...	Do.	1930
5. Home-made malt foods from great millet.	......	Do.	1930
6. How to control jasmine bug.	Y. Ramachandra Rao.	English, Telugu, Tamil and Kanarese.	1930
7. Note on ensilage	R. W. Littlewood...	English, Telugu, Tamil, Kanarese and Malayalam.	1930
8. No water-rate or faslijasti for certain crops, concessions made by Government.	......	Do.	1930
9. Planting of trees on poramboke lands.	......	Do.	1931
10. Loans to ryots	......	Do.	1931
11. Green manuring in Gōdāvari, Vizagapatam and Ganjām districts.	A. C. Edmonds ...	English, Telugu and Oriya.	1929

I.—FREE PUBLICATIONS—*cont.*

D.—Leaflets—*cont.*

Number and subject.	Author.	Languages published.	Year of publication.
12. The production of fodder and green manuring of seeds.	A. C. Edmonds ...	English and Telugu.	1929
13. Conversion of prickly-pear into manure.	B. Viswanath ...	English, Telugu, Tamil, Malayalam and Kanarese.	1930
14. Army worm of paddy ...	Y. Ramachandra Rao.	Do.	1931
15. How to use crab traps in paddy fields.	K. Venkataraman ...	Do.	1928
16. Varieties of sugarcane in Vizagapatam district.	A. C. Edmonds ...	English	1929
17. Improvement of sugarcane seed.	Do. ...	English and Telugu.	1929
18. Potatoes	F. H. Butcher ...	English, Telugu, Tamil, Malayalam and Kanarese.	1930
19. School garden	......	Do.	1930
20. Turmeric cultivation ...	......	Do.	1930
21. How to send specimens ...	S. Srinivasa Ayyangar.	Do.	1931
22. Training of practical cultivators.	......	Do.	1928
23. Red hairy caterpillar pest.	Y. Ramachandra Rao.	English, Telugu, Tamil and Kanarese.	1930
24. Care and management of cattle manure in South India.	V. Muttuswami Ayyar.	English, Tamil, Telugu, Malayalam and Kanarese.	1931
25. Green manuring	B. Ramayya ...	Do.	1931
26. Note on tapioca	K. Unnikrishna Menon.	Do.	1931
27. Telugu songs on improved method of paddy cultivation.	D. Balakrishnamurti Garu.	Telugu	1931
28. Weeds—weeds—weeds ...	D. T. Chadwick ...	English, Tamil, Telugu, Malayalam and Kanarese.	1931
29. The Sindhewahe furnace for jaggery manufacture.	C. Narayana Ayyar.	Do.	1931
30. Red rot disease of sugarcane.	S. Sundararama Ayyar.	Do.	1931
31. The mosaic disease of sugarcane.	Do.	Do.	1931
32. Coconut stem bleeding disease.	Do.	Do.	1931
33. Pure cotton	B. Ramayya ...	English and Tamil.	1931
34. Sprayers and spraying ...	S. Sundararama Ayyar.	English, Tamil, Telugu, Malayalam and Kanarese.	1931
35. Prickly-pear cochineal ...	Y. Ramachandra Rao.	Do.	1931
36. Bud rot of palmyras ...	S. Sundararama Ayyar.	Do.	1931

I.—FREE PUBLICATIONS—*cont.*

D.—Leaflets—*cont.*

Number and subject.	Author.	Languages published.	Year of publication.
37. Mildew on grapes and how to prevent it.	S. Sundararama Ayyar.	English, Tamil, Telugu, Malayalam and Kanarese.	1931
38. Water hyacinth	D. T. Chadwick ...	Do.	1931
39. The Deccan grasshopper pest.	Y. Ramachandra Rao.	Do.	1931
40. The swarming caterpillar of paddy.	T. V. Ramakrishna Ayyar.	Do.	1931
41. The rice bug	Do.	Do.	1931
42. The rice hispa	Do.	Do.	1931
43. Smut diseases of cholam and tenai.	S. Sundararama Ayyar.	Do.	1931
44. The control of rice grasshopper in Malabar.	Y. Ramachandra Rao.	Malayalam ...	1931
45. Early sowing of Cambodia cotton.	V. Ramanatha Ayyar.	English and Tamil.	1932
46. Die back disease of cashewnuts.	S. Sundararama Ayyar.	English, Tamil, Telugu and Kanarese (Malayalam under print).	1933
47. Note on cashewnut cultivation.	M. K. Nambiyar ...	English, Tamil, Telugu, Kanarese and Malayalam.	1933
48. The paddy grasshopper and its control.	Dr. T. V. Ramakrishna Ayyar.	English, Tamil, Telugu, Kanarese, Malayalam and Oriya.	1933
49. Institution of prizes for calves born to premium bulls.	S. V. Ramamurti ...	English, Tamil, Telugu, Kanarese and Malayalam.	1933
50. The improvement of the quality of South Indian groundnuts.	Dr. J. S. Patel ...	Do.	1933
51. The manufacture of white sugar by the open pan system.	S. Sitaram Patrudu.	Do.	1933
52. Selection work in coconuts.	Dr. J. S. Patel ...	English ... ... Tamil, Telugu, Kanarese and Malayalam.	1933 1934
53. Koleraga or Mahali disease of arecanuts and coconuts.	S. Sundararama Ayyar.	English (Tamil, Telugu, Kanarese and Malayalam under print).	1934
54. Some advantages of poultry keeping.	R. W. Littlewood...	English, Telugu, Kanarese (Tamil and Malayalam under print).	1934
55. Natural incubation of poultry.	Do. ...	English, Kanarese (Tamil, Telugu and Malayalam under print).	1934
56. Breeding and rearing of chicks.	Do. ...	English, Telugu (Tamil, Kanarese and Malayalam under print).	1934
57. Housing of poultry ...	R. W. Littlewood and H. Narahari Rao.	English (Tamil, Telugu, Kanarese and Malayalam under print).	1934

I.—FREE PUBLICATIONS—*cont.*

D.—Leaflets—*cont.*

Number and subject.	Author.	Languages published.	Year of publication.
58. Lucerne	R. W. Littlewood...	English (Tamil, Telugu and Kanarese under print).	1934
59. The improvement of coconut under dry cultivation.	K. W. Chakrapani Marar.	English (Kanarese and Malayalam under print).	1934

Old Publication.

1. The coconut		English, Kanarese and Malayalam.	1925

II.—PRICED PUBLICATIONS.

A.—Bulletins.

Number and subject.	Author.	Languages published.	Price. RS.	A.	P.	Year of publication.
1. Survey of Madras dairy trade.	A. Carruth	English.	0	12	0	1921
2. The work of Livestock section.	R. W. Littlewood ...	Do.	0	6	0	1929
3. History of certain crops from sowing to harvest and describing their vicissitudes under adverse seasonal conditions.	......	Do.	0	2	0	1927
4. Some aspects of dairying at the Agricultural College, Coimbatore.	D. Ananda Rao ...	Do.	1	0	0	1921
5. The conduct of field experiments.	R. O. Iliffe and B. Viswanath.	Do.	1	4	0	1928
6. Field experiments with calcium cyanamide as a nitrogenous manure for South Indian soils and crops.	B. Viswanath and Kasinatha Ayyar.	Do.	0	4	0	1929
7. Cultivation of grape vines.	......	Do.	0	2	0	1929
8. Summary of results of experiments on paddy conducted at Manganallur Station.	N. S. Kulandaswami.	Do.	1	14	0	1923
9. Manurial problem and its solution.	R. D. Anstead ...	Do.	0	2	0	1928
10. Pepper cultivation on the West Coast.	M. Govindakidavu and P. A. Venkateswaran.	English and Malayalam.	0	2	0	1929
11. Cultivation of plantains in Gōdāvari.	J. Jogi Raju	English, Tamil and Telugu.	0	2	0	1928 and 1929

II.—PRICED PUBLICATIONS—*cont.*

A.—Bulletins—*cont.*

Number and subject.	Author.	Languages published.	Price. RS. A. P.	Year of publication.
12. Results of experiments on intermediate season cropping, conducted at Agricultural Research Station, Samalkota.	A. C. Edmonds ...	English.	0 2 0	1929
13. The mosaic disease of sugarcane.	S. Sundararaman ...	Do.	0 6 0	1928
14. Soil survey of Tanjore delta.	W. H. Harrison and P. A. Raghunathaswami Ayyangar.	Do.	1 6 0	1921
15. Soil survey of Guntūr delta.	W. H. Harrison and B. Viswanath.	Do.	1 8 0	1915
16. Soil survey of Gōdāvari district.	R. V. Norris and Assistants.	Do.	2 12 0	1922
17. Soil survey of Periyar tract.	Do.	Do.	1 14 0	1923
18. Soil survey of Kistna delta.	W. H. Harrison and M. R. R. Sivan.	Do.	2 4 0	1928
19. Soil survey of Malabar...	B. Viswanath and T. S. Ramasubrahmanya Ayyar.	Do.	1 6 0	1928
20. Irrigation	R. C. Wood	Do.	1 0 0	1921
21. Catalogue of plants for sale at Government Botanic Gardens, Ootacamund.	F. H. Butcher ...	...	0 4 0	1930
22. The ground, earth or peanut.	......	English.	0 4 0	1923
23. Grass farming in Coimbatore.	D. G. Munro ...	English and Tamil.	0 2 0	1931
24. Graft mango gardens—How to start and maintain them.	G. Jogi Raju	English and Telugu.	0 2 0	1931
25. Insects affecting the paddy plant in South India.	T. V. Ramakrishna Ayyar.	English.	0 3 0	1931
26. Insects affecting tobacco in South India.	Do.	Do.	0 1 0	1932
27. Insects injurious to crops in South India.	Do.	Do.	0 8 0	1932
28. Insects affecting the cotton plant in South India.	Do.	Do.	0 4 0	1932
29. Tamil sayings and proverbs on Agriculture.	......	Tamil with Translation in English.	0 12 0	1933
30. The cultivation of Coimbatore seedling sugarcanes in South India.	A. C. Edmonds, S. Sitarama Patrudu and M. Ramamurti.	English and Telugu.	0 4 0	1933
31. Telugu sayings and proverbs on Agriculture.	......	Telugu with Translation in English.	0 8 0	1933

II.—PRICED PUBLICATIONS—*cont.*

A.—Bulletins – *cont.*

Number and subject.	Author.	Languages published.	Price. RS. A. P.	Year of publication.
32. Fungoid diseases of important crops in Madras Presidency.	S. Sundararama Ayyar and C. S. Krishnaswami.	English.	1 2 0	1933
33. South Indian fodders ...	P. V. Ramiah ...	Do.	0 4 0	1933
34. Insects injurious to vegetable and flower-plants in South India.	Dr. T. V. Ramakrishna Ayyar.	Do.	0 6 0	1933
35. Kanarese proverbs on Agriculture.	......	Kanarese with Translation in English.	0 1 0	1934

B.– Books.

1. Notebook of agricultural facts and figures.	R. C. Wood ...	English.	1 0 0	...
2. Practical botany	K. Ranga Achari ...	Do.	1 8 0	...
3. The Madras flora	Gamble, volumes 1 to 8.	Do.	6 8 0 per volume.	...
4. A handbook of South Indian grasses.	K. Ranga Achariyar.	Do.	4 8 0	...
5. Administration Report (published annually).	......	Do.	Prices can be had on application.	...
6. Subordinate Officers' report (published annually).	......	Do.		
7. Some South Indian weeds.	C. Tadulingam and G. V. Narayana.	Do.	4 0 0	...
8. Manual of Elementary Botany for India.	M.R.Ry. Diwan Bahadur K. Ranga Achariyar.	Do.	4 0 0	...

57. Calendar, 1935.

JANUARY

Rithu	Tamil Month	Tamil Date	English Date	Week days	Thithis in ghatikas (naligais) and vighatikas (vinadis)		Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis)	
Hemantha Rithu.	Margali—Thanur. Dhakshinayanam.	18	1	Tuesday ...	Ekadasi ...	25 47	Visakham ...	45 1
		19	2	Wednesday	Dwadasi ...	23 56	Anusham ...	43 47
		20	3	Thursday ...	Thrayodasi	21 36	Kettai ...	41 59
		21	4	Friday ...	Chathurdasi	18 3	Mulam ...	39 36
		22	5	Saturday ...	● Amavasai	13 15	Puradam ...	36 00
		23	6	Sunday ...	Prathamai ...	7 48	Uthiradam ...	32 23
		24	7	Monday ...	Dwithiyai... Thrithiyai...	2 24 56 23	Sravanam...	28 47
		25	8	Tuesday ...	Chathurthi ...	50 22	Avittam ...	24 36
		26	9	Wednesday...	Panchami ...	45 0	Sathayam ...	20 25
		27	10	Thursday ...	Shashti ...	39 37	Purattathi ...	16 49
		28	11	Friday ...	Sapthami ...	34 49	Uthirattathi	12 36
		29	12	Saturday ...	Ashtami ...	30 36	Revathi ...	11 25
		30	13	Sunday ...	Navami ...	28 13	Aswini ...	9 37
	Thai—Magaram. Utharayanam.	1	14	Monday ...	Dasami ...	23 48	Bharani ...	8 24
		2	15	Tuesday ...	Ekadasi ...	25 12	Krithikai ...	9 1
		3	16	Wednesday...	Dwadasi ...	25 47	Rohini ...	11 23
		4	17	Thursday ...	Thrayodasi ...	28 13	Mrigasiram ...	13 47
		5	18	Friday ...	Chathurdasi ...	30 35	Arudra ...	17 58
		6	19	Saturday ...	○ Pournami	35 26	Punarvasu ...	23 25
		7	20	Sunday ...	Prathamai ...	40 12	Pusam ...	28 47
		8	21	Monday ...	Dwithiyai ...	45 35	Ayilyam ...	35 25
		9	22	Tuesday ...	Thrithiyai ...	50 56	Makham ...	42 1
		10	23	Wednesday...	Chaturthi ...	55 48	Puram ...	47 59
		11	24	Thursday ...	Panchami ...	59 25	Uthiram ...	53 23
		12	25	Friday ...	Shashti ...	60 0	Hastham ...	57 11
		13	26	Saturday ...	Shashti ...	2 23	Chithirai ...	60 0
		14	27	Sunday ...	Sapthami ...	4 47	Chithirai ...	1 44
		15	28	Monday ...	Ashtami ...	5 23	Swathi ...	3 36
		16	29	Tuesday ...	Navami ...	4 11	Visakham ...	4 11
		17	30	Wednesday	Dasami ...	2 25	Anusham ...	3 35
		18	31	Thursday ...	Ekadasi ... Dwadasi ...	0 3 55 47	Kettai ... Mulam ...	2 25 59 24

1935.

Amirthathiyogams.	Feasts, fasts, festivals and * Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Marana ; Sidda ...	Sarva Ekadasi ; New years' day.	Cattle fair at Samayapuram, Lalgudi Taluk, Trichinopoly District, for 10 days during January 1935. Nearest railway station is Bikshandarkoil, 4 miles.
Amirtha ; Sidda ...	Pradosham.	
Prabhala ; Sidda ...	Sivarathri.	
Amirtha ; Prabhala.		
Sidda.		Agricultural exhibition at Srirangam, for 20 days during (Vaikunta Ekadasi). Nearest railway station is Srirangam, Trichinopoly District.
Amirtha	Pushyam.	
Amirtha ; Sidda ...	Shavval month 1st.	Agricultural exhibition at Aduthurai, Kumbakonam taluk for a day in the third week of January.
Sidda ; Marana.		
Sidda ; Amirtha.		
Sidda.		
Sidda ; Amirtha.		
Marana ; Sidda.		
Sidda ; Marana ...	Makara Ravi 58·2 ; Bhogi Pandigai.	
Sidda ; Marana ...	Utharayanam ; Sankaranthi Pandigai ; Krithikai Vratham.	
Sidda ; Amirtha ...	Mattu Pongal ; Sarva Ekadasi ; Sivaram Parvattai.	
Sidda	Pradosham; Sengunram Parvattai.	
Marana.		
Sidda.		
Sidda	Perunthevi Thayar Theppam.	
Sidda	Thai Pusam.	
Sidda ; Marana.		
Sidda.		
Amirtha.		
Marana ; Sidda.		
Amirtha ; Sidda.		
Marana.		
Sidda.		
Amirtha ; Marana.		
Marana ; Sidda.		
Amirtha ; Sidda ...	Sarva Ekadasi.	
Prabhala ; Sidda ...		
Sidda.		

Amirtha = Amirthayogam.
Sidda = Siddayogam.
} Good or auspicious.

Marana = Maranayogam.
Prabhala = Prabhalanishtayogam.
Uthpatha = Uthpathayogam.
} Bad or inauspicious.

FEBRUARY

Tamil. Month.	Tamil. Date.	English Date.	Week days.	Thithis in ghatikas (naligais) and vighatikas (vinadis).	Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis).
Uttarayanam. Thai—Magaram. Hemantha Rithu.	19	1	Friday ...	Thrayodasi ... 51 0	Puradam 56 24
	20	2	Saturday ...	Chathurdasi 45 37	Uthiradam 52 47
	21	3	Sunday ...	● Amavasai 39 35	Sravanam 49 11
	22	4	Monday ...	Prathamai ... 39 36	Avittam 45 2
	23	5	Tuesday ...	Dwithiyai ... 27 37	Sathayam 40 47
	24	6	Wednesday.	Thrithiyai ... 22 11	Purattathi 37 11
	25	7	Thursday ...	Chathurthi ... 17 24	Uthirattathi... ... 33 35
	26	8	Friday ...	Panchami ... 12 25	Revathi 31 12
	27	9	Saturday ...	Shashti ... 8 23	Aswini 28 47
	28	10	Sunday ...	Sapthami ... 6 1	Bharani 28 11
	29	11	Monday ...	Ashtami ... 4 13	Krithikai 28 46
Masi—Kumbam. Sisi Rithu.	1	12	Tuesday ...	Navami ... 3 36	Rohini 30 1
	2	13	Wednesday...	Dasami ... 4 11	Mrigasiram 32 25
	3	14	Thursday ...	Ekadasi ... 6 35	Arudra 36 35
	4	15	Friday ...	Dwadasi ... 6 37	Punarvasu 41 23
	5	16	Saturday ...	Thrayodasi .. 13 49	Pusam 46 47
	6	17	Sunday ...	Chathurdasi 18 35	Ayilyam 35 25
	7	18	Monday ...	○ Pournami 23 59	Makham 60 0
	8	19	Tuesday ...	Prathamai ... 28 47	Makham 0 3
	9	20	Wednesday.	Dwithiyai ... 32 58	Puram 6 37
	10	21	Thursday ...	Thrithiyai ... 37 11	Uthiram 11 59
	11	22	Friday ...	Chathurthi ... 40 49	Hastham 16 13
	12	23	Saturday ...	Panchami ... 42 35	Chithirai 20 22
	13	24	Sunday ...	Shashti . 42 36	Swathi 22 47
	14	25	Monday ...	Sapthami ... 41 58	Visakham 23 25
	15	26	Tuesday ...	Ashtami ... 39 36	Anusham 23 26
	16	27	Wednesday...	Navami ... 36 0	Kettai 22 12
	17	28	Thursday ...	Dasami ... 32 23	Mulam 20 29

1935.

Amirthathiyogams.	Feasts, fasts, festivals and * Government holidays.
Prabhala; Sidda ...	Pradosham.
Sidda	Sivarathri.
Amirtha; Marana ...	Thai Amavasai.
Sidda	Magam.
Marana.	
Amirtha; Sidda ...	Jilkath month 1st.
Sidda	Gustava-Chathurthi.
Amirtha	Madana Panchami.
Sidda	Chandrarka Vritham.
Prabhala; Sidda ...	Krithikai Vratham.
Marana; Amirtha ...	Ratha Sapthami.
Amirtha; Sidda ...	Kumbha Ravi 25-18.
Sidda	Thirukkatchiyur Rishaba Vaganam.
Marana; Amirtha ...	Sarva Ekadasi.
Sidda; Uthpatha ...	Pradosham.
Sidda; Marana.	
Sidda; Marana. ...	Thiruvottiyur Maghizhadi.
Marana	Masi Makham; Rayajikula Theppam.
Sidda.	
Amirtha.	
Marana; Sidda.	
Amirtha; Sidda.	
Marana; Amirtha.	
Sidda; Uthpatha.	
Marana; Sidda.	
Sidda; Uthpatha.	
Sidda; Marana.	
Sidda.	

Dates of cattle fairs, cattle shows and agricultural exhibitions.

Cattle fair at Tenagal, Kalyandrug Taluk, Anantapur District, from 23rd to 27th February 1935. Nearest railway station is Rayadrug, 35 miles or Anantapur via Kodur, 5 miles.

Cattle fair at Venkatagirikota for 10 days during the 2nd week of February. Nearest railway station is Kuppam.

Agricultural exhibition at Palni during 2nd week of February 1935. Nearest railway station is Palni

Cattle fair at Gooliam, hamlet of Doddamari, Kollegal Taluk, during February 1935. Nearest railway station is Maddur, 58 miles.

Cattle fair at Madagondapalli, Hosur Taluk, Salem District, during car festival in February 1935. Nearest railway station is Kelamangalam.

Cattle fair at Mecheri, Salem District, during Badrakaliamman festival for five days from Masi Makham 1st week of February 1935. Nearest railway station is Mecheri.

Cattle fair at Peddamanuthur during Sri Subrahmanyaswami Parasha from 9th to 14th February 1935. Nearest railway station is Penukonda.

Cattle fair at Kalipatti, Tiruchengodu Taluk, Salem District, during the Kalipatti car festival for 6 days from Thai pusam (1st week of February). Nearest railway station is Kalipatti.

Amirtha = Amirthayogam. } Good or auspicious.
Sidda = Siddayogam.

Marana = Maranayogam. } Bad or inauspicious.
Prabhala = Prabhalanishtayogam.
Uthpatha = Uthpathayogam.

MARCH

Season	Tamil Month	Tamil Date	English Date	Week days	Thithis in ghatikas (naligais) and vighatikas (vinadis)		Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis)	
Sisi Rithu. Utharayanam.	Masi—Kumbam.	18	1	Friday	Ekadasi	27 35	Puradam	17 34
		19	2	Saturday	Dwadasi	22 49	Uthiradam	13 46
		20	3	Sunday	Thrayodasi	16 47	Sravanam	9 35
		21	4	Monday	Chathurdasi	10 45	Avittam	5 23
		22	5	Tuesday	● Amavasai Prathamai	4 49 59 23	Sathayam Purattathi	1 11 57 37
		23	6	Wednesday	Dwithiyai	53 59	Uthirattathi	54 2
		24	7	Thursday	Thrithiyai	49 12	Revathi	51 3
		25	8	Friday	Chathurthi	44 59	Aswini	48 35
		26	9	Saturday	Panchami	42 32	Bharani	47 23
		27	10	Sunday	Shashti	40 48	Krithikai	47 59
		28	11	Monday	Sapthami	36 37	Rohini	49 13
		29	12	Tuesday	Ashtami	40 41	Mrigasiram	50 58
		30	13	Wednesday	Navami	42 36	Arudra	54 36
	Panguni—Minam.	1	14	Thursday	Dasami	45 3	Punarvasu	59 24
		2	15	Friday	Ekadasi	49 47	Pusam	60 0
		3	16	Saturday	Dwadasi	54 35	Pusam	5 23
		4	17	Sunday	Thrayodasi	60 0	Ayilyam	11 25
		5	18	Monday	Thrayodasi	0 4	Makham	17 59
		6	19	Tuesday	Chathurdasi	5 20	Puram	23 58
		7	20	Wednesday	○ Pournami	10 7	Uthiram	29 59
		8	21	Thursday	Prathamai	13 45	Hastham	35 24
		9	22	Friday	Dwithiyai	16 9	Chithirai	38 58
		10	23	Saturday	Thrithiyai	17 58	Swathi	41 23
		11	24	Sunday	Chathurthi	17 58	Visakham	42 35
		12	25	Monday	Panchami	17 22	Anusham	42 34
		13	26	Tuesday	Shashti	15 1	Kettai	41 59
		14	27	Wednesday	Sapthami	12 0	Mulam	40 13
		15	28	Thursday	Ashtami	7 47	Puradam	37 11
		16	29	Friday	Navami Dasami	2 59 57 1	Uthiradam	33 35
		17	30	Saturday	Ekadasi	50 59	Sravanam	29 59
		18	31	Sunday	Dwadasi	44 59	Avittam	25 47

1935.

Amirthathiyogams.	Feasts, fasts, festivals and * Government holidays.
Prabhala ; Sidda ...	Urs. George ; Sarva Ekadasi.
Sidda	Sani Pradosham.
Amirtha ; Marana ...	Maha Sivarathri.
Sidda	Triplicane Theppam.
Marana ; Marana ; Amirtha.	......
Sidda ; Uthpatha ...	Palgunam ; Ash Wednesday.
Sidda ; Amirtha ...	Jilhaj month 1st.
Amirtha ; Sidda ...	......
Sidda ; Amirtha ...	......
Sidda	Krithikai Vratham.
Amirtha	......
Sidda ; Marana ...	......
Sidda	......
Amirtha	Meena Ravi 13-42.
Uthpatha	Sarva Ekadasi ; Tirunarayanavaram Vairamudi.
Sidda ; Marana ...	......
Sidda ; Marana ..	Mylapore Kabali Car ; Urs. Patrick.
Marana ; Sidda ...	Mylapore Aruvathimuvar.
Sidda ; Amirtha ...	Tiruvamur Natanam.
Amirtha ; Marana ...	Panguni Uthiram ; Kamadaganam ; Holi Pandigai.
Sidda	Vasantho:hsavam.
Sidda	......
Amirtha ; Sidda ...	......
Uthpatha ; Marana ...	......
Sidda	......
Uthpatha ; Amirtha ...	Kalathur Garudan.
Marana ; Amirtha ...	Madurantakam Peria Perumal Uthsavam.
Sidda	......
Sidda ; Marana ...	......
Sidda	Smartha Ekadasi ; Kanji Solotsava Sathumurai.
Marana ; Sidda ...	Vaishnava Ekadasi.

Dates of cattle fairs, cattle shows and agricultural exhibitions.

Agricultural exhibition at Nellore during the festival of Sri Ranganayakaswami from 14th to 22nd March 1935. The nearest railway station is Nellore.

Cattle fair at Gorantla, Kurnool Taluk, from 21st to 26th March 1935. Nearest railway station is Ulindakonda, 8 miles.

Cattle fair at Nanguvally during Lakshmi Narasimhaswami car festival from Panguni Uthiram for 5 days, in the last week of March and 1st week of April. Nearest railway station is Mecheri Road.

Cattle fair at Kalugumalai, Kovilpatti Taluk, from 19th March to 2nd April 1935. Nearest railway station is Kovilpatti.

Cattle fair at Karamadai during car festival about 10th March 1935. Nearest railway station is Karamadai, Coimbatore District.

Agricultural exhibition during Jagannatha temple festival, Vayahalam Desam, Kottayam Taluk, on or about 1st week of March 1935. Nearest railway station is Tellicherry, 2 miles.

Cattle fair at Rallabdugur, 10 miles from Kuppam for about 8 days during 2nd week of March 1935.

Cattle fair at Attur, Nilakkottai Taluk, for a week from 15th March 1935. Nearest railway station is Ambathurai, 5 miles.

Cattle fair at Nilakkottai, Madura District, for a week preceding the full moon day in Panguni. Nearest railway station is Kodaikanal Road R.S., 6 miles.

Cattle fair at Adamankottai, Dharmapuri Taluk, for 8 days from 20th March 1935. Nearest railway station is Dharmapuri.

Cattle fair at Mailam during Panguni Uthiram, Tindivanam Taluk. Nearest railway station is Mailam.

Cattle f·ir at Melmalayanur, Gingee Taluk, from 7th to 13th March 1935 during the Angalan,man festival. Nearest railway station, Tindivanam.

Amirtha = Amirthayogam. } Good or auspicious.
Sidda = Siddayogam.

Marana = Maranayogam. } Bad or inauspicious.
Prabhala = Prabhalanishtayogam.
Uthpatha = Uthpathayogam

APRIL

Tamil. Month.	Tamil. Date.	English Date.	Week days.	Thithis in ghatikas (naligais) and vighatikas (vinadis).			Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis).		
Utharayanam. Panguni—Minam. Sisi Rithu.	19	1	Monday ...	Thrayodasi	39	2	Sathayam ...	... 21	35
	20	2	Tuesday ...	Chathurdasi	33	36	Purattathi ...	... 18	2
	21	3	Wednesday	● Amavasai	28	11	Uthirattathi	... 14	24
	22	4	Thursday ...	Prathamai ...	23	24	Revathi ...	... 10	49
	23	5	Friday ...	Dwithiyai ...	19	12	Aswini ...	... 8	24
	24	6	Saturday ...	Thrithiyai ...	16	47	Bharani ...	... 7	48
	25	7	Sunday ...	Chathurthi ...	15	3	Krithikai ...	... 7	13
	26	8	Monday ...	Panchami ...	13	47	Rohini ...	... 7	47
	27	9	Tuesday ...	Shashti ...	13	14	Mrigasiram ...	... 10	13
	28	10	Wednesday	Sapthami ...	15	35	Arudra ...	... 13	12
	29	11	Thursday ...	Ashtami ...	19	12	Punarvasu ...	... 18	2
	30	12	Friday ...	Navami ...	23	25	Pusam ...	... 23	22
	31	13	Saturday ...	Dasami ...	28	14	Ayilyam ...	... 29	25
Chithrai—Mesham. Vasantha Rithu.	1	14	Sunday ...	Ekadasi ...	34	36	Makham ...	... 36	36
	2	15	Monday ...	Dwadasi ...	40	26	Puram ...	... 43	42
	3	16	Tuesday ...	Thrayodasi ...	45	20	Uthiram ...	... 49	53
	4	17	Wednesday ...	Chathurdasi	49	3	Hastham ...	... 54	59
	5	18	Thursday ...	○ Pournami	51	36	Chithirai ...	... 58	58
	6	19	Friday ...	Prathamai ...	53	1	Swathi ...	[illegible]0	0
	7	20	Saturday ...	Dwithiyai ...	53	21	Swathi	[illegible]	[illegible]
	8	21	Sunday ...	Thrithiyai ...	52	45	Visakham ...	[illegible]	3[illegible]
	9	22	Monday ...	Chathurthi ...	51	17	Anusham ...	[illegible]	[illegible]
	10	23	Tuesday ...	Panchami ...	48	57	Kettai ...	... [illegible]	[illegible]
	11	24	Wednesday	Shashti ...	45	54	Mulam ...	... [illegible]	[illegible]
	12	25	Thursday ...	Sapthami ...	42	1	Puradam / Uthiradam	... 2 / ... 0	23 / 5
	13	26	Friday ...	Ashtami ...	37	19	Sravanam ...	... 57	0
	14	27	Saturday ...	Navami ...	31	54	Avittam ...	... 53	14
	15	28	Sunday ...	Dasami ...	25	46	Sathayam ...	... 48	51
	16	29	Monday ...	Ekadasi ...	19	10	Purattathi ...	... 44	4
	17	30	Tuesday ...	Dwadasi ...	12	17	Uthirattathi	... 39	9

1935.

Amirthathiyogams.	Feasts, fasts, festivals and * Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Sidda.		
Marana ; Amirtha ...	Krishnangaraga ; Chathurdasi ...	Cattle fair at Gudipalli, Venkatagiri-kota Sub-Taluk, during the 2nd week of April for 9 days. Nearest railway station, Gudipalli.
Sidda ; Uthpatha.		
Sidda ; Amirtha ...	Chaitram ; Yugathi ; Telugu New Year's day.	Cattle fair at Ellutla, Vayalpad Taluk, from 18th to 27th April 1935. Nearest railway station, Vayalpad.
Amirtha ; Sidda ...	Sowbagya Vratham ; Muharram month 1st.	
Sidda ; Amirtha ...	Rajamannar Vennaithazhi Krithikai.	
Sidda.		
Amirtha.		
Sidda ; Marana.		Cattle fair at Idayakottai in 1st week of April during Mariamman festival for five days. Nearest railway station is Oddanchatram, 12 miles.
Sidda.		
Amirtha.		
Uthpatha ; Marana ...	Sri Rama Navami.	
Marana ; Amirtha ...	Mesha Ravi 34-3.	Cattle fair at Pudupatti, Salem District, during 1st week of April. Nearest railway station is Salem Town.
Marana ; Sidda ...	Ekadasi Vratham ; Muharram 10th day ; Kurutholai Thirunal.	Cattle fair at Nirathanallur, Kumbakonam Taluk, Tanjore District, for one month from March 1935. Nearest railway station is Kumbakonam, 6 miles.
Sidda	Tiruvaiyar Ratham.	
Amirtha ; Sidda ...	Tiruvallur Ratham ; Pradosham.	Cattle fair at Pasuvandanai, Kovilpatti Taluk, Tinnevelly District, from 21st April to 5th May 1935. Nearest railway station is Kadambur.
Marana ; Sidda ...	Madura Ratham.	
Sidda ; Amirtha ...	Chitrapournami ; Maundy Thursday ; Chitraguptar Thirukalyanam.	
Sidda	Chitrabagulam ; New Friday ; Salem Ratham.	
Amirtha ; Sidda ...	Triplicane Garudan.	Cattle fair at Nathathahalli, Dharmapuri Taluk, Salem District, about the full moon (18th April 1935). Nearest railway station is Dharmapuri.
Uthpatha ; Marana.	Easter day.	
Sidda	Thirunirmalai Garudan.	
Uthpatha ; Amirtha.	Urs. George.	Cattle fair at Sivalaperi, Tinnevelly Taluk, from 13th to 28th April 1935. Nearest railway station is Gangaikondan.
Marana ; Amirtha ...	Sri Perumbudur Ratham.	
Sidda.		
Sidda ; Marana		
Sidda	Sabapathi abishegam.	Cattle fair at Kannapuram, hamlet of Pachapalaiyam, Dharapuram Taluk, for about a week during the car festival on the Chitrapournami day. Nearest railway station is Erode, 45 miles.
Sidda ; Amirtha.		
Sidda	Dasami Thithi ; Low Sunday.	
Sidda	Ekadasi Vratham ; Thithithvayam.	
Amirtha ; Sidda ...	Pradosham ; Thrayodasi Thithi.	

Amirtha = Amirthayogam. } Good or auspicious.
Sidda = Siddayogam.

Marana = Maranayogam. } Bad or inauspicious.
Prabhala = Prabhalanishtayogam.
Uthpatha = Uthpathayogam.

MAY

Rithu / Ayanam	Tamil Month	Tamil Date	English Date	Week days	Thithis in ghatikas (naligais) and vighatikas (vinadis)			Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis)		
Vasantha Rithu. Utharayanam.	Chitrai—Mesham.	18	1	Wednesday...	Thrayodasi ... Chathurdasi ...	5 59	28 1	Revathi	34	23
		19	2	Thursday ...	● Amavasai	53	17	Aswini	30	8
		20	3	Friday ...	Prathamai ...	48	37	Bharani	26	53
		21	4	Saturday ...	Dwithiyai	45	24	Krithikai	24	57
		22	5	Sunday ...	Thrithiyai ...	43	55	Rohini	24	38
		23	6	Monday ...	Chathurthi ...	44	20	Mrigasiram	26	6
		24	7	Tuesday ...	Panchami ...	46	39	Arudra	29	33
		25	8	Wednesday.	Shashti ...	50	42	Punarvasu	34	44
		26	9	Thursday ...	Sapthami ...	56	2	Pusam	41	17
		27	10	Friday ...	Ashtami ...	60	0	Ayilyam	48	39
		28	11	Saturday ...	Ashtami ...	2	8	Makham	56	15
		29	12	Sunday ...	Navami ...	8	21	Puram	60	0
		30	13	Monday ...	Dasami ...	14	6	Puram	3	30
	Vaikasi—Rishapam.	1	14	Tuesday ...	Ekadasi ...	18	55	Uthiram	9	53
		2	15	Wednesday.	Dwadasi ...	22	21	Hastham	15	1
		3	16	Thursday ...	Thrayodasi ...	24	20	Chithirai	18	40
		4	17	Friday ...	Chathurdasi	24	56	Swathi	21	8
		5	18	Saturday ...	○ Pournami	24	9	Visakham	22	11
		6	19	Sunday ...	Prathamai ...	22	10	Anusham	22	2
		7	20	Monday ...	Dwithiyai ...	19	19	Kettai	21	1
		8	21	Tuesday ...	Thrithiyai ...	15	35	Mulam	19	14
		9	22	Wednesday.	Chathurthi ...	11	21	Puradam	16	52
		10	23	Thursday ...	Panchami ...	6	41	Uthiradam	14	1
		11	24	Friday ...	Shashti ... Sapthami ...	1 56	39 34	Sravanam	10	51
		12	25	Saturday ...	Ashtami ...	50	55	Avittam	7	31
		13	26	Sunday ...	Navami ...	45	21	Sathayam	3	58
		14	27	Monday ...	Dasami ...	39	48	Purattathi ... ... Uthirattathi ...	0 56	21 48
		15	28	Tuesday ...	Ekadasi ...	34	26	Revathi	53	29
		16	29	Wednesday.	Dwadasi ...	29	24	Aswini	50	39
		17	30	Thursday ...	Thrayodasi ...	25	0	Bharani	48	29
		18	31	Friday ...	Chathurdasi	21	30	Krithikai	47	17

1935.

Amirthathiyogams.	Feasts, fasts, festivals, and *Government holidays.
Uthpatha; Marana ...	Sivarathri, Avama.
Amirtha; Sidda ...	Amavasai.
Sidda	Krithikai Vratham; Vaisaga Suddham.
Amirtha	Kathiri beginning.
Sidda	Sabar month 1st.
Amirtha; Sidda ...	Sri Udayavar Thirtham.
Marana; Sidda ...	Sri Sankara Jayanti.
Sidda	Shasti Vratham.
Amirtha; Sidda ...	Amman Katshi ?
Marana	Thirutninasbrigh.
Amirtha; Sidda.	
Sidda.	
Sidda	Thirukkannapuram Garudan.
Amirtha; Sidda ...	Rishapa Ravi 30-0; Vishnupathi Ekadasi Vratham.
Marana; Sidda ...	Pradosham.
Sidda; Amirtha ...	Sri Narasimha Jayanti.
Sidda	Narasimha Jayanthi (Mada.); Kanji Garudan; Darathaji.
Sidda	Thirukkannapuram Car.
Marana	Vaisaga bagulam.
Sidda.	
Amirtha; Sidda ...	Kanji Car.
Amirtha.	
Sidda.	
Marana; Sidda ...	Avama; Birthday of Queen Victoria.
Sidda.	
Sidda	Rogation Sunday.
Sidda.	
Sidda	Ekadasi Vratham; End of Kathiri.
Marana; Sidda ...	Pradosham; Agraisara Shamba.
Sidda; Marana ...	Sivarathri; Ascension Day.
Sidda; Marana ...	Krithikai Vratham; Thithithvayam.

Dates of cattle fairs, cattle shows and agricultural exhibitions.

Cattle fair at Kila Viraraghavapuram, Tinnevelly Taluk, from 29th May to 12th June 1935. Nearest railway station, Kurichi.

Cattle fair at Gudur, Kurnool District from 11th to 13th May 1935. Nearest railway station, Kurnool, 18 miles.

Cattle fair at Old Batlagundu, Nilakkottai Taluk, Madura District, for a week from 15th May 1935. Nearest railway station is Kodaikanal Road, R.S., 14 miles.

Cattle fair at Avanashi, Coimbatore District, between the last week of April and 1st week of May 1935. Nearest railway station is Vanjipalaiyam.

Cattle fair at Tallakulam, Madura District, during 1st week of May 1935 during Alagar festiva Nearest railway station is Madura, 2 miles.

Cattle fair from 7th May 1935 for 10 days at Virapandi, Periyakulam Taluk, Madura District. Nearest railway station is Teni, 3 miles.

Agri-Horticultural exhibition at Ootacamund during the last week of May 1935. Nearest railway station is Ootacamund.

Cattle fair and show at Punganur, Chittoor District, in middle of May. Nearest railway station is Madanapalli, 23 miles.

Cattle fair at Kanniseri, Sattur Taluk, Ramnad District, from 19th May to 2nd June 1935. Nearest railway station is Tulukkapatti.

Cattle fair at Nilakkottai, Madura District, for a week from May–June 1935. Nearest railway station is Kodaikanal Road, R.S., 6 miles.

Cattle fair at Kathacheruvu, for 9 days from 18th May 1935, Penukonda Taluk. Nearest railway station is Makkajipalli, 12 miles.

Cattle fair at Kalliarkoyil, Sivaganga Taluk, Ramnad District, from 10th May 1935 for a fortnight. Nearest railway station is Nattarasankottai.

Amirtha = Amirthayogam., Sidda = Siddayogam. } Good or auspicious.

Marana = Maranayogam., Prabhala = Prabhalanishtayogam., Uthpatha = Uthpathayogam. } Bad or inauspicious.

JUNE

Tamil Month	Tamil Date	English Date	Week days	Thithis in ghatikas (naligais) and vighatikas (vinadis).			Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis).		
Uttarayanam. Vaikasi—Rishapam. Vasantha Rithu.	19	1	Saturday ...	● Amavasai.	19	7	Rohini	47	18
	20	2	Sunday ...	Prathamai ...	18	4	Mrigasiram	48	44
	21	3	Monday ...	Dwithiyai ...	18	33	Arudra	51	43
	22	4	Tuesday ...	Thrithiyai ...	20	37	Punarvasu	56	15
	23	5	Wednesday	Chathurthi ...	24	7	Pusam	60	0
	24	6	Thursday ...	Panchami ...	29	1	Pusam	2	4
	25	7	Friday ...	Shashti ...	34	48	Ayilyam	8	59
	26	8	Saturday ...	Sapthami ...	40	53	Makham	16	22
	27	9	Sunday ...	Ashtami ...	46	42	Puram	23	50
	28	10	Monday ...	Navami ...	51	41	Uthiram	30	40
	29	11	Tuesday ...	Dasami ...	55	23	Hastham	31	21
	30	12	Wednesday	Ekadasi ...	57	32	Chithirai	40	34
	31	13	Thursday ...	Dwadasi ...	57	59	Swathi	43	7
	32	14	Friday ...	Thrayodasi ...	56	45	Visakham	44	5
Ani—Mithunam. Greeshma Rithu.	1	15	Saturday ...	Chathurdasi	54	2	Anusham	43	31
	2	16	Sunday ...	◯ Pournami	50	2	Kettai	41	38
	3	17	Monday ...	Prathamai ...	45	0	Mulam	38	40
	4	18	Tuesday ...	Dwithiyai ...	39	16	Puradam	34	57
	5	19	Wednesday...	Thrithiyai ...	33	1	Uthiradam	30	43
	6	20	Thursday ...	Chathurthi ...	26	33	Sravanam	26	16
	7	21	Friday ...	Panchami ...	20	4	Avittam	21	48
	8	22	Saturday ...	Shashti ...	13	50	Sathayam	17	34
	9	23	Sunday ...	Sapthami ...	7	59	Purattathi	13	44
	10	24	Monday	Ashtami ... Navami ...	2 57	38 52	Uthirattathi ...	10	26
	11	25	Tuesday ...	Dasami ...	53	53	Revathi	7	40
	12	26	Wednesday...	Ekadasi ...	50	44	Aswini	5	49
	13	27	Thursday ...	Dwadasi ...	48	33	Bharani	4	46
	14	28	Friday ...	Thrayodasi ...	47	24	Krithikai	4	42
	15	29	Saturday ...	Chathurdasi	47	25	Rohini	5	41
	16	30	Sunday ...	● Amavasai	48	40	Mrigasiram... ...	7	48

1935.

Amirthathiyogams.	Feasts, fasts, festivals, and *Government holidays.
Amirtha ; Sidda ...	Prathamathithi.
Sidda	Jyeshatasuddam.
Sidda ; Amirtha ...	Rubulavil month 1st.
Sidda	Athithi.
Sidda	Chathurthi Thithi.
Amirtha ; Sidda ...	Thirumangalam Yagauthsavam.
Marana	Shashti vritham; Singaperumal Koil Garudan.
Amirtha ; Sidda.	
Sidda ; Amirtha ...	Whitsunday; Tanjore Garudan.
Sidda	Parvadaroganam.
Sidda	Singaperumalkoil car.
Sidda	Ekadasi Vritham.
Amirtha ; Sidda ...	Needamangalam car.
Sidda	Bara-wafat; Pradosham ; Mithuna Ravi, 46-43 ; Triplicane Alagiasingar Garudan.
Sidda.	
Marana ; Amirtha.	Koyambedu Garudan ; Thiruthava Sunday.
Sidda ; Uthpatha ...	Jyeshtabagulam ; Mannargudi floating festival.
Sidda ; Prabala ...	Triplicane, Koyambedu, Saidapet car.
Amirtha ; Sidda.	
Sidda	Corpus Christi.
Sidda	Thithithvayam.
Amirtha ; Sidda ...	Sapthami Thithi.
Sidda ; Amirtha.	
Sidda	Avama; Rain; Urs memory Arulappar.
Sidda.	
Marana ; Sidda ...	Ekadasi Vritham.
Sidda ; Marana ...	Krithikai Vritham.
Sidda ; Marana ...	Pradosham.
Amirtha ; Sidda.	Sivarathri.
Sidda	Ani Amavasai ; Tiruvellur floating festival.

Dates of cattle fairs, cattle shows, and agricultural exhibitions.

Cattle fair at Sembapatti, Nilakkottai Taluk, for a week from 26th June 1935. Nearest railway station is Ambadurai, 4 miles.

Cattle fair at Kallikiri, Vayalpad Taluk, Chittoor District, from 23rd June to 2nd July 1935. Nearest railway station is Kallikiri, ½ mile.

Cattle fair at Lakkayankottai, hamlet of Salaipudur, about 14th June 1935, during Uchi Mahaliamman festival for a week. Nearest railway station is Oddanchatram, 2 miles.

Agri-Horticultural show at Coonoor on a Saturday in June 1935. Nearest railway station is Coonoor.

Cattle and pony show, and Industrial and Agricultural exhibitions for 3 days from the full moon day of Vaikasi at Tirupur. Nearest railway station is Tiruppur.

Cattle fair at Muttalapuram, Kovilpatti Taluk, after Ani-Tirunal in June 1935. Nearest railway station is Nalli.

Cattle fair at Alwartirunagari, Tiruchendur Taluk, Tinnevelly District, for 2 weeks from last week of May or 1st week of June 1935. Nearest railway station is Alwartirunagari.

Amirtha = Amirthayogam. } Good or auspicious.
Sidda = Siddayogam.

Marana = Maranayogam. } Bad or inauspicious.
Prabhala = Prabhalanishtayogam.
Uthpatha = Uthpathayogam.

JULY

Tamil. Month.	Tamil. Date.	English Date.	Week days.	Thithis in ghatikas (naligais) and vighatikas (vinadis).		Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis).	
Greeshma Rithu. Ani—Mithunam. Utharayanam.	17	1	Monday ...	Prathamai ...	51 11	Arudra ...	... 11 8
	18	2	Tuesday ...	Dwithiyai ...	54 55	Punarvasu ...	... 15 44
	19	3	Wednesday ...	Thrithiyai ...	59 43	Pusam ...	... 21 27
	20	4	Thursday ...	Chathurthi ...	60 0	Ayilyam ...	... 28 6
	21	5	Friday ...	Chathurthi ...	5 18	Makham ...	... 35 25
	22	6	Saturday ...	Panchami ...	11 22	Puram ...	... 42 58
	23	7	Sunday ...	Shashti ...	17 33	Uthiram ...	... 50 12
	24	8	Monday ...	Sapthami ...	22 51	Hastham ...	... 56 40
	25	9	Tuesday ...	Ashtami ...	27 21	Chithirai ...	... 60 0
	26	10	Wednesday ...	Navami ...	30 16	Chithirai ...	... 1 53
	27	11	Thursday ...	Dasami ...	31 26	Swathi ...	... 5 30
	28	12	Friday ...	Ekadasi ...	30 46	Visakam ...	... 7 18
	29	13	Saturday ...	Dwadasi ...	28 13	Anusham ...	... 7 18
	30	14	Sunday ...	Thrayodasi ...	23 56	Kettai ...	... 5 34
	31	15	Monday ...	Chathurdasi ...	18 14	Mulam ... Puradam	... 2 18 ... 57 50
Adi—Katagam. Dhakshinayanam.	1	16	Tuesday ...	○ Pournami	11 25	Uthiradam ...	... 52 29
	2	17	Wednesday ...	Prathamai Dwithiyai	3 51 55 51	Sravanam ...	... 46 36
	3	18	Thursday ...	Thrithiyai ...	17 45	Avittam ...	... 40 32
	4	19	Friday ...	Chathurthi ...	39 53	Sathayam ...	... 34 39
	5	20	Saturday ...	Panchami ...	32 30	Purattathi ...	... 29 15
	6	21	Sunday ...	Shashti ...	25 58	Uthirattathi ...	... 24 45
	7	22	Monday ...	Sapthami ...	20 36	Revathi ...	... 21 16
	8	23	Tuesday ...	Ashtami ...	16 23	Aswini ...	... 19 0
	9	24	Wednesday ...	Navami ...	13 28	Bharani ...	... 18 3
	10	25	Thursday ...	Dasami ...	11 56	Krithikai ...	... 18 26
	11	26	Friday ...	Ekadasi ...	11 11	Rohini ...	... 20 9
	12	27	Saturday ...	Dwadasi ...	12 47	Mrigasiram ...	... 23 8
	13	28	Sunday ...	Thrayodasi ...	15 5	Arudra ...	... 27 10
	14	29	Monday ...	Chathurdasi	18 27	Punarvasu ...	... 32 23
	15	30	Tuesday ...	● Amavasai	22 46	Pusam ...	... 38 27
	16	31	Wednesday ...	Prathamai ...	27 56	Ayilyam ...	... 45 16

1935.

Amirthathiyogams.	Feasts, fasts, festivals, and * Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Sidda ; Amirtha ...	Ashada Suddam.	
Sidda.		
Sidda	Rabyusani month 1st.	
Sidda ; Amirtha ...	Thiruthinaspiruk.	
Marana ; Sidda.		
Sidda ; Uthpatha ...	Seevaram Garudan.	
Amirtha	Sapthami Thithi ; Ani Tirumanjanam ; Shashti Vratham.	
Sidda ; Prabhala ...	Athithi ; Seevaram car.	
Sidda	Ashtami Thithi ; Trivellore Jyeshtabishekam.	
Sidda	Ani Garudan.	
Amirtha ; Sidda ...	Srimushnam Jyestabishekam.	
Sidda	Ekadasi Vritham.	
Sidda	Sanipradosham ; Garvin.	
Marana ; Amirtha ...	Thithithvayam ; Karaikalammaiyar Mangani Uthsavam.	
Sidda ; Uthpatha ; Marana.	Pournami Thithi.	
Prabhala ; Sidda ...	Kataka Ravi 13-49 ; Dakshinayanam.	
Sidda ; Prabhala ...	Ashada bagulam ; Avama.	
Sidda ; Marana ...	Thrithiyathithi.	
Sidda.		
Sidda.		
Amirtha	Shashti thithi.	
Sidda	Thithithvayam.	
Sidda	Navami thithi ; Rain.	
Sidda ; Amirtha ...	Adi Krithigai ; Krithigavritham Thiruthani floating festival.	
Marana ; Uthpatha ...		
Marana ; Sidda ...	Ekadasi Vritham.	
Sidda	Prathosham.	
Sidda	Sivarathri.	
Amirtha ; Sidda ...	Amavasai Thithi.	
Sidda	Athithi ; Thiruvayar amman Katchi.	
Sidda	Parthama thithi ; Sravana suddam.	

Amirtha = Amirthayogam. } Good or auspicious.
Sidda = Siddayogam.

Marana = Maranayogam. } Bad or inauspicious.
Prabhala = Prabhalanishatayogam
Uthpatha = Uthpathayogam.

AUGUST

Tamil Month	Tamil Date	English Date	Week days	Thithis in ghatikas (naligais) and vighatikas (vinadis)	Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis)
Dakshinayanam. Adi—Katagam. Greeshma Rithu.	17	1	Thursday	Dwithiyai 33 41	Makham 52 28
	18	2	Friday	Thrithiyai 39 47	Puram 60 0
	19	3	Saturday	Chathurthi 45 58	Puram 0 7
	20	4	Sunday	Panchami 51 45	Uthiram 7 38
	21	5	Monday	Shashti 56 34	Hastham 14 39
	22	6	Tuesday	Sapthami 60 0	Chithirai 20 53
	23	7	Wednesday	Sapthami 0 26	Swathi 25 53
	24	8	Thursday	Ashtami 3 2	Visakham 29 12
	25	9	Friday	Navami 3 34	Anusham 30 39
	26	10	Saturday	Dasami 2 11 Ekadasi 58 52	Kettai 30 13
	27	11	Sunday	Dwadasi 53 48	Mulam 27 54
	28	12	Monday	Thrayodasi 47 10	Puradam 23 48
	29	13	Tuesday	Chathurdasi 39 19	Uthiradam 18 22
	30	14	Wednesday	○ Pournami 30 35	Sravanam 11 53
	31	15	Thursday	Prathamai 21 17	Avittam 4 48 Sathayam 57 35
	32	16	Friday	Dwithiyai 11 58	Purattathi 50 35
Avani—Simmam. Varsha Rithu.	1	17	Saturday	Thrithiyai 3 6 Chathurthi 54 56	Uthirattathi 44 14
	2	18	Sunday	Panchami 47 54	Revathi 38 57
	3	19	Monday	Shashti 42 17	Aswini 35 2
	4	20	Tuesday	Sapthami 38 21	Barani 32 49
	5	21	Wednesday	Ashtami 36 14	Krithikai 32 23
	6	22	Thursday	Navami 35 57	Rohini 33 46
	7	23	Friday	Dasami 37 23	Mrigasiram 36 50
	8	24	Saturday	Ekadasi 40 19	Arudra 41 19
	9	25	Sunday	Dwadasi 44 27	Punarvasu 46 59
	10	26	Monday	Thrayodasi 49 29	Pusam 53 29
	11	27	Tuesday	Chathurdasi 55 12	Ayilyam 60 0
	12	28	Wednesday	● Amavasai 60 0	Ayilyam 0 36
	13	29	Thursday	● Amavasai 1 15	Magam 8 1
	14	30	Friday	Prathamai 7 27	Puram 15 36
	15	31	Saturday	Dwithiyai 13 37	Uthiram 23 6

1935.

Amirthathiyogams.	Feasts, fasts, festivals, and *Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Amirtha ; Sidda.	Rameswaram Ambal car.	
Sidda	Thiruvadi Pooram ; cauvery Perukku ; Jamathilavil month first Valli Thirumanam.	
Sidda ; Uthpatha.		
Amirtha	Garudanaga Panchami.	
Sidda ; Prabala ...	Shashti Vritham.	
Sidda	Thirurhinaspiruk.	
Sidda	Thirukkachiyur Yanaivaganam ...	Cattle fair and Agricultural show at Sankarankoil during Adi Tapaz. Tinnevelly District. Nearest railway station is Sankarankoil.
Sidda.		
Sidda ; Marana ...	Varalakshmi Vritham.	
Sidda.	Smartha Ekadasi ; Avama ; Kalahasti Garudan.	
Amirtha ; Sidda ...	Vaishnava Ekadasi Vritham.	Cattle fair at Pudupalaiyam, hamlet of Jettisamudram, Bhavani Taluk, from 7th to 11th August 1935, during the Gurunathaswami temple festival. Nearest railway station is Erode.
Uthpatha ; Marana ...		
Prabala ; Sidda.	Pradosham ; Kalahasti car.	
Sidda ; Prabala.	Poornima thithi ; Gajendramoksham ; Rig, Yajur upakarnam.	
Sidda ; Marana ...	Thiththvayam ; Sravana Pagulam ; assumption day.	Cattle fair at Vadamadura, Dindigul Taluk, during Adi Alagar festival for 17 days from the full moon day in Adi. Nearest railway station is Vadamadura.
Sidda.		
Sidda	Simha Ravi, 34-34 ; Adi Pandigai ; Vishnupathi ; Mahakrithikai.	Cattle fair at Kila Trichendur, Trichendur Taluk for 2 weeks in August 1935. Nearest railway station is Trichendur.
Sidda ; Prabala ...	Avama ; Kollam Year.	
Amirtha ; Sidda ...	Panchami Thithi.	
Sidda.		
Sidda	Gokulashtami.	
Amirtha ; Sidda ...	Krithigavritham ; Ramanathapuram Uriyadi.	
Uthpatha ; Marana ...	Sri Jayanthi ; Rains.	
Sidda.		
Sidda...	Ekadasi Vritham.	
Sidda...	Kannan Garudaservai.	
Sidda...	Pradosham.	
Sidda...	Sivarathri.	
Sidda...	Thiruthinaspiruk.	
Amirtha ; Sidda.		
Sidda...	Pathrapathasuddem ; Pappa Karthigai.	
Uthpatha ; Marana ...	Thrithia thithi.	

Sidda = Siddayogam. Amirtha = Amirthayogam. } Good or auspicious. | Uthpatha = Uthpathayogam. Prabhala = Prabhalanishtayogam. Marana = Maranayogam. } Bad or inauspicious.

SEPTEMBER

Tamil Month	Tamil Date	English Date	Week days	Thithis in ghatikas (naligais) and vighatikas (vinadis)		Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis)	
Varsha Rithu. Dhakshinayanam. Avani—Simmam.	16	1	Sunday	Thrithiyai	16 26	Hastham	30 15
	17	2	Monday	Chathurthi	24 47	Chithrai	36 50
	18	3	Tuesday	Panchami	29 18	Swathi	42 31
	19	4	Wednesday	Shashti	32 35	Visakham	47 1
	20	5	Thursday	Sapthami	34 24	Anusham	50 3
	21	6	Friday	Ashtami	34 33	Kettai	51 2
	22	7	Saturday	Navami	32 51	Mulam	50 51
	23	8	Sunday	Dasami	29 17	Puradam	48 28
	24	9	Monday	Ekadasi	23 46	Uthiradam	44 21
	25	10	Tuesday	Dwadasi	16 41	Sravanam	38 49
	26	11	Wednesday	Thrayodasi Chathurdasi	8 20 59 8	Avittam	32 6
	27	12	Thursday	○ Pournami	49 27	Sathayam	24 33
	28	13	Friday	Prathamai	39 23	Purattathi	16 50
	29	14	Saturday	Dwithiyai	30 19	Uthirattathi	9 18
	30	15	Sunday	Thrithiyai	21 56	Revathi Aswini	2 32 59 55
	31	16	Monday	Chathurthi	14 55	Bharani	52 51
Purattasi—Kanni.	1	17	Tuesday	Panchami	9 33	Krithikai	50 39
	2	18	Wednesday	Shashti	6 5	Rohini	50 30
	3	19	Thursday	Sapthami	4 45	Mirgasiram	52 24
	4	20	Friday	Ashtami	5 30	Arudra	56 11
	5	21	Saturday	Navami	8 6	Punarvasu	60 0
	6	22	Sunday	Dasami	12 20	Punarvasu	1 35
	7	23	Monday	Ekadasi	17 37	Pusam	8 5
	8	24	Tuesday	Dwadasi	23 41	Ayilyam	15 22
	9	25	Wednesday	Thrayodasi	30 3	Makham	22 57
	10	26	Thursday	Chathurdasi	36 21	Puram	30 35
	11	27	Friday	● Amavasai	42 23	Uthiram	37 54
	12	28	Saturday	Prathamai	47 55	Ashtami	44 47
	13	29	Sunday	Dwithiyai	52 54	Chitrai	51 7
	14	30	Monday	Thrithiyai	57 10	Swathi	56 45

1935.

Amirthathiyogams.	Feasts, fasts, festivals, and * Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Amirtha ; Sidda ...	Athithi ; Sama Upakarnam.	Cattle fair at Sivalaperi, Tinnevelly Taluk, from 1st to 15th September 1935. Nearest railway station is Gangaikondan.
Prabhala ; Amirtha...	Chathurthi thithi ; Vinayaka Chathurthi.	
Sidda ; Marana ...	Rishi Panchami.	
Sidda ; Amirtha ...	Shashtivritham.	
Sidda ; Prabhala.		
Marana ; Amirtha.		
Sidda	Avani moolam ; Madura Pittu Thirunal. Tiruvayar floating festival.	Cattle fair during Saiyid Sha Baba Fakr-ud-din's Urs festival from 9th to 13th September 1935, at Penukonda. Nearest railway station, Penukonda.
Sidda ; Amirtha ...	Dasami thithi.	
Marana ; Amirtha ..	Ekadasivritham ; Thithithvayam.	
Sidda	Sravana Dwadasi ; Thrayodasi ; Onam ; Sama Sravaram ; Prathosham.	
Prabhala ; Sidda ...	Ananthapadmanabha Vritham ; Avarna.	
Marana ; Sidda ...	Kanji Pavitrotsavam beginning.	Cattle fair at Singikulam, Nanguneri taluk, from 1st to 15th September 1935. Nearest railway station, Shermadevi.
Sidda.	Uththa Karthigai ; Pathrapatha bagulam ; Mahalaya beginning.	
Sidda ; Prabhala ...	Dwithiya thithi.	
Amirtha ; Sidda ; Prabhala.	Thithithvayam.	
Sidda ; Marana ...	Kanya Ravi 34-32 ; Mahabarani Shadasithi.	Cattle fair at Vadakkuvalliyur Nanguneri Taluk during September 1935. Nearest railway station, Tinnevelly Bridge.
Sidda ; Amirtha ...	Kirthikai Vritham.	
Sidda.		
Marana.		
Sidda	Rain.	
Sidda.		
Sidda.		
Sidda...	Ekadasi Vritham ; Dwadasi Thithi.	
Sidda...	Athithi.	
Sidda ; Amirtha ...	Pradosham ; Sivarathri ; Thrayodasi thithi.	
Sidda ; Marana ...	Hastha Karthigai.	
Sidda ; Amirtha ...	Mahalaya Amavasai.	
Marana	Asvuja Suddam ; Navarathri Pooja begins.	
Sidda...	Urs Michael.	
Amirtha ; Marana ...	Rajjub month 1st.	

Amirtha = Amirthayogam. } Good or auspicious.
Sidda = Siddayogam.

Marana = Maranayogam. } Bad or inauspicious.
Prabhala = Prabhalanishtayogam.
Uthpatha = Uthpathayogam.

OCTOBER

Tamil. Month.	Tamil. Date.	English. Date.	Week days.	Thithis in ghatikas (naligais) and vighatikas (vinadis).	Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis).
Dhakshinayanam. Purattasi—Kanni. Varsha Rithu.	15	1	Tuesday ...	Chathurthi 60 0	Visakham 60 0
	16	2	Wednesday...	Chathurthi ... 0 30	Visagam 1 33
	17	3	Thursday ...	Panchami ... 2 50	Anusham 5 20
	18	4	Friday ...	Shashti ... 3 53	Kettai 7 49
	19	5	Saturday ...	Sapthami ... 3 26	Mulam 8 56
	20	6	Sunday ...	Ashtami... 1 22; Navami ... 57 40	Puradam 8 26
	21	7	Monday ...	Dasami ... 52 20	Uthiradam 6 13
	22	8	Tuesday ...	Ekadasi ... 45 36	Sravanam ... 2 30; Avittam ... 57 26
	23	9	Wednesday...	Dwadasi ... 37 41	Sathayam 51 7
	24	10	Thursday ...	Thrayodasi ... 28 53	Purattathi 44 8
	25	11	Friday ...	Chathurdasi ...19 36	Uthirattathi ... 36 47
	26	12	Saturday ...	○ Pournami...10 22	Revathi 29 34
	27	13	Sunday ...	Prathamai. 1 37; Dwithiyai. 53 48	Aswini 23 4
	28	14	Monday ...	Thrithiyai ... 47 20	Bharani 17 42
	29	15	Tuesday ...	Chathurthi ... 42 38	Krithikai 13 56
	30	16	Wednesday...	Panchami ... 39 58	Rohini 12 0
Arpisi—Thula. Sarath Rithu.	1	17	Thursday ...	Shashti ... 39 29	Mrigasiram ... 12 10
	2	18	Friday ...	Sapthami ... 11 11	Arudra 14 26
	3	19	Saturday ...	Ashtami ... 44 47	Punarvasu 18 37
	4	20	Sunday ...	Navami ... 49 49	Pusam 24 22
	5	21	Monday ...	Dasami ... 55 51	Ayilyam 31 24
	6	22	Tuesday ...	Ekadasi ... 60 0	Makham 38 57
	7	23	Wednesday...	Ekadasi ... 2 16	Puram 46 33
	8	24	Thursday ...	Dwadasi ... 8 38	Uthiram 53 48
	9	25	Friday ...	Thrayodasi 14 32	Hastham 60 00
	10	26	Saturday ...	Chathurdasi 19 45	Hastham 0 27
	11	27	Sunday ...	● Amavasai 24 9	Chithirai 6 21
	12	28	Monday ...	Prathamai ... 27 39	Swathi 11 26
	13	29	Tuesday ...	Dwithiyai ... 30 16	Visagam 15 39
	14	30	Wednesday...	Thrithiyai ... 31 55	Anusham 18 59
	15	31	Thursday ...	Chathurthi ... 32 38	Kettai 21 22

1935.

Amirthathiyogams.	Feasts, fasts, festivals, and * Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Maranam	Thiruthivaspiruk ; Tirupathi garudan.	
Sidda ; Amirtha.		
Sidda ; Prabhala.		
Marana ; Amirtha ...	Shashti Vritha[illegible].	
Siddam.	Tirupathi Car.	Cattle fair at Guliam, hamlet of Doddamari, Kollegal taluk during October 1935. Nearest railway station Maddur, 58 miles.
Sidda ; Amirtha ...	Ayudapuja ; Maha Navami ; Avama.	
Marana ; Amirtha ...	Vijayadasami ; Gunaseelam Car.	
Sidda. / Sidda ; Marana.	Ekadasi Vritham.	
Sidda ; Amirtha.		
Sidda	Thrayodasi Thithi ; Sidda Karthigai.	Agricultural Exhibition at Dharakota during September or October. Nearest railway station Berhampur, 28 miles.
Sidda ; Amirtha ...	Thithithvayam ; Nataraja Abishagam.	
Prabhala ; Sidda ...	Parathama Thithi.	
Sidda ; Prabala ...	Avama ; Asuviyujabagulam.	
Sidda ; Marana ...	Krithiga Vritham.	
Sidda ; Amirtha.		
Sidda.		
Marana	Thula Kaveri Snanam Begins Thula Ravi 2-403 Visnu[illegible].	Cattle show at Coimbatore under the auspices of the S.P.C.A. during the middle of October. Nearest railway station is Coimbatore. Cattle fair at Kilaviraraghavapuram, Tinnevelly taluk, from 17th September to 6th October 1935. Nearest railway station Kurichi.
Sidda	Rain.	
Sidda.		
Sidda.		
Sidda ; Marana.		
Sidda	Thiruthivaspiruk.	
Amirtha	Ekadasi Vritham ; Swathi Karthigai.	
Marana ; Sidda ...	Pradosham.	
Amirtha	Sivarathri night ; Naragachathurthasi Snanam ; Iddi Rajjub.	Cattle and Pony show fair at Agaram, Dindigul taluk in October 1935, during the Muthalamman festival.
Marana	Athithi ; Deepavali.	
Sidda	Amavasai Thithi ; Kethara Vritham.	
Amirtha ; Marana.	Karthiga suddam ; Vikrama Sagam ; Triplicane Annagoodam.	
Marana ; Sidda.		
Amirtha ; Sidda ...	Shabam month 1st.	
Prabala ; Sidda.		

Amirtha = Amirthayogam., Sidda = Siddayogam. } Good or auspicious.

Marana = Maranayogam., Prabhala = Prabhalanishtayogam., Uthpatha = Uthpathayogam. } Bad or inauspicious.

NOVEMBER

Season	Tamil Month	Tamil Date	English Date	Week days	Thithis in ghatikas (naligais) and vighatikas (vinadis)		Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis)	
Sarath Rithu. Dhakshinayanam.	Arpisi—Thula.	16	1	Friday	Panchami	32 19	Mulam	22 48
		17	2	Saturday	Shashti	30 52	Puradam	23 7
		18	3	Sunday	Sapthami	28 14	Uthiradam	22 15
		19	4	Monday	Ashtami	24 21	Sravanam	20 8
		20	5	Tuesday	Navami	19 9	Avittam	16 52
		21	6	Wednesday	Dasami	12 57	Sathayam	12 31
		22	7	Thursday	Ekadasi Dwadasi	5 53 58 12	Purattathi	7 15
		23	8	Friday	Thrayodasi.	50 17	Uthirattathi Revathi	1 27 55 24
		24	9	Saturday	Chathurdasi.	42 30	Aswini	49 31
		25	10	Sunday	○ Pournami.	35 11	Bharani	44 12
		26	11	Monday	Prathami	28 42	Krithikai	39 53
		27	12	Tuesday	Dwithiyai	23 52	Rohini	36 58
		28	13	Wednesday	Thrithiyai	20 37	Mrigasiram	35 47
		29	14	Thursday	Chathurthi	19 22	Arudra	36 35
		30	15	Friday	Panchami	20 2	Punarvasu	39 21
	Karthigai—Vrichiga.	1	16	Saturday	Shashti	22 45	Pusam	43 59
		2	17	Sunday	Sapthami	27 2	Ayilyam	50 1
		3	18	Monday	Ashtami	32 43	Magham	57 4
		4	19	Tuesday	Navami	39 0	Puram	60 0
		5	20	Wednesday.	Dasami	45 21	Puram	4 30
		6	21	Thursday	Ekadasi	51 14	Uthiram	11 50
		7	22	Friday	Dwadasi	56 14	Hastham	18 34
		8	23	Saturday	Thrayodasi	60 0	Chithirai	24 38
		9	24	Sunday	Thrayodasi	0 12	Swathi	29 7
		10	25	Monday	Chathurdasi	2 58	Visakham	32 37
		11	26	Tuesday	● Amavasai	4 28	Anusham	34 59
		12	27	Wednesday.	Prathamai	4 52	Kettai	36 20
		13	28	Thursday	Dwithiyai	4 15	Mulam	36 41
		14	29	Friday	Thrithiyai	2 46	Puradam	36 20
		15	30	Saturday	Chathurthi Panchami	0 23 57 19	Uthiradam	35 9

1935.

Amirthathiyogams.	Feasts, fasts, festivals, and *Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Prabhala; Sidda.		
Sidda	Shashti Vratam; Skantha Shashti, Surasamharam.	
Amirtha.		
Amirtha; Sidda.	Ashtami Thithi.	
Sidda; Marana ...	Thithithvayam; Mahabalipuram Palanquin.	
Sidda; Amirtha ...	Ekadasi Thithi; Vaisaga Karthikai.	Cattle fair and Agricultural exhibition during the Kalpatti car festival in Palghat taluk from 12th to 15th November. Nearest railway station, Olavakkot, 1 mile.
Sidda	Ekadasi Vratham; Avama.	
Sidda; Amirtha ...	Prathosham; Mayuram Car.	
Sidda	Mayuram Aswini Thirtham.	
Prabhala; Sidda ...	Annabishegam; Thiruvinthalur Garudan.	
Marana; Amirtha ...	Karthigabagulam; Krithikai Vratham; Armistice day.	
Amirtha; Sidda ...	Dwithiya Thithi.	
Sidda	Thithithvayam; Shaba-ba-rat.	
Marana; Amirtha ...	Panchami Thithi.	
Sidda; Uthpatha ...	Thulasnanam ends.	
Sidda; Marana ...	Vrichiga Ravi 3-15; Vishnupathi Mudavan Muzhukku; Rains.	
Sidda; Marana.		
Marana; Sidda ...	Thirukkadavur; Virattanam Sangu Abishegam.	Cattle fair at Tiruvannamalai, North Arcot district, for 15 days in the last week of November or the first week of December. Nearest railway station is Tiruvannamalai.
Sidda	Anuratha; Karthikai.	
Amirtha.		
Marana; Sidda ...	Ekadasi Vratham.	
Amirtha; Sidda.		
Marana	Prathosham; Thiruthinasprik.	
Sidda; Uthpatha ...	Sivarathri.	
Marana; Sidda ...	Amavasai Thithi.	
Sidda; Uthpatha.		
Sidda; Marana ...	Margasira Suddam.	
Sidda	Ramzan Month 1st.	
Prabala; Sidda ...		
Sidda	Avama; Urs Belavendirar.	

Amirtha = Amirthayogam. Sidda = Siddayogam. } Good or auspicious. | Marana = Maranayogam. Prabhala = Prabhalanishtayogam. Uthpatha = Uthpathayogam. } Bad or inauspicious.

DECEMBER

Tamil. Month.	Tamil. Date.	English. Date.	Week days.	Thithis in ghatikas (naligais) and vighatikas (vinadis).		Nakshatras or stars in ghatikas (naligais) and vighatikas (vinadis).	
Dhakshinayanam. Karthigai—Vrichiga. Sarath Rithu.	16	1	Sunday ...	Shashti ...	53 29	Sravanam ...	... 33 16
	17	2	Monday ...	Sapthami ...	48 59	Avittam ...	... 30 40
	18	3	Tuesday ...	Ashtami ...	43 55	Sathayam ...	... 27 29
	19	4	Wednesday.	Navami ...	38 22	Purattathi ...	... 23 47
	20	5	Thursday ...	Dasami ...	32 37	Uthirattathi	... 19 41
	21	6	Friday ...	Ekadasi ...	26 33	Revathi ...	... 15 22
	22	7	Saturday ...	Dwadasi ...	20 22	Aswini ...	... 11 5
	23	8	Sunday ...	Thrayodasi ...	14 47	Bharani ...	... 7 10
	24	9	Monday ...	Chathurdasi	9 48	Krithikai ...	... 3 51
	25	10	Tuesday ...	○ Pournami.	5 50	Rohini ...	... 1 23
	26	11	Wednesday...	Prathamai ...	3 7	Mrigasiram ...	... 0 11
	27	12	Thursday ...	Dwithiyai ...	1 55	Arudra ...	... 0 28
	28	13	Friday ...	Thrithiyai ...	2 22	Punarvasu ...	... 2 19
	29	14	Saturday ...	Chathurthi ...	4 32	Pusam ...	... 5 50
	30	15	Sunday ...	Panchami ...	8 17	Ayilyam ...	... 10 50
Margali—Thanus. Hemantha Rithu.	1	16	Monday ...	Shashti ...	13 23	Makham ...	... 17 8
	2	17	Tuesday ...	Sapthami ...	19 20	Puram ...	... 24 12
	3	18	Wednesday...	Ashtami ...	25 36	Uthiram ...	... 31 33
	4	19	Thursday ...	Navami ...	31 41	Hastham ...	... 38 35
	5	20	Friday ...	Dasami ...	36 54	Chithirai ...	... 44 48
	6	21	Saturday ...	Ekadasi ...	40 53	Swathi ...	... 49 49
	7	22	Sunday ...	Dwadasi ...	43 24	Visakham ...	... 53 24
	8	23	Monday ...	Thrayodasi ...	44 21	Anusham ...	... 55 30
	9	24	Tuesday ...	Chathurdasi	43 47	Kettai ...	... 56 8
	10	25	Wednesday...	● Amavasai	43 12	Mulam ...	... 57 36
	11	26	Thursday ...	Prathamai ...	40 48	Puradam ...	... 59 58
	12	27	Friday ...	Dwithiyai ...	38 24	Uthiradam ...	... 55 12
	13	28	Saturday ...	Thrithiyai ...	34 12	Sravanam ...	... 52 47
	14	29	Sunday ...	Chathurthi ...	29 24	Avittam ...	... 49 13
	15	30	Monday ...	Panchami ...	24 36	Sathayam ...	... 45 34
	16	31	Tuesday ...	Shasti ...	18 36	Purattathi ...	... 41 58

1935.

Amirthathiyogams.	Feasts, fasts, festivals and *Government holidays.	Dates of cattle fairs, cattle shows and agricultural exhibitions.
Amirtha ; Marana ...	Shashti Vratham ; Agamana Sunday; Tiruchendur Thirukalyanam.	
Sidda	Jyeshta Karthigai.	
Marana.		
Amirtha ; Sidda.		
Sidda.		
Amirtha	Ekadasi Vratham ; Kausika Ekadasi.	
Sidda	Sani Pradosham.	
Prabhala ; Sidda ...	Krithiga Vratham ; Krithiga Deepam.	
Marana ; Amirtha ...	Tirukkalikkundram Sangu abishegam.	Cattle fair at Kizhur, Kurumbranad Taluk, Malabar District, for 1 week, from 11th December 1935. Nearest railway station is Thikkoti, 3½ miles.
Amirtha ; Sidda ...	Sarvalaya Vishnu Deepam.	
Sidda	Margasira Bahulam.	
Marana ; Amirtha.		
Sidda ; Uthpatha.		
Sidda ; Marana.		
Sidda ; Marana ...	Saba Ravi 38–57 ; Shadasethi last Sunday Uthsavam; Virinchipuram Mula Karthigai.	
Marana ; Sidda ...	Thanurmasa Puja begins.	
Sidda ; Amirtha.		
Amirtha ; Marana ...	Ashtagai.	Cattle fair at Kulkunda in Subrahmanya Village, Puttur Taluk, South Kanara District, for 15 days from the fullmoon day of the lunar month of Karthikai. Nearest railway station is Mangalore, 67 miles.
Sidda.		
Sidda.		
Marana ; Sidda ...	Ekadasi Vratham; Urs, Thomayar.	
Uthpatham ; Marana.		
Sidda	Pradosham ; Sivarathri.	
Uthpatha ; Amirtha.		
Marana ; Amirtha ...	Amavasai ; Christ's Birthday.	
Sidda	Pushya Suddam.	
Sidda ; Marana.		
Sidda...	Garppottam begins, Kuthba Divval month 1st.	
Marana ; Sidda ...	Chathurthi Thithi.	
Sidda	Panchami Thithi.	
Marana ; Amirtha ...	Shashti Vratham ; Thithithvayam.	

Amirtha = Amirthayogam. } Good or auspicious.
Sidda = Siddayogam.

Marana = Maranayogam. } Bad or inauspicious.
Prabhala = Prabhalanishtayogam.
Uthpatha = Uthpathayogam.

58. Raghu and Gulikai Kalams.

	Raghu Kalam (Inauspicious).		Gulikai Kalam (Auspicious).	
	From	To	From	To
Sunday ..	4–30 p.m.	6 p.m.	3 p.m.	4–30 p.m.
Monday ..	7–30 a.m.	9 a.m.	1–30 p.m.	3 p.m.
Tuesday ..	3 p.m.	4–30 p.m.	12 noon.	1–30 p.m.
Wednesday.	12 noon	1–30 p.m.	10–30 a.m.	12 noon.
Thursday ..	1–30 p.m.	3 p.m.	9 a.m.	10–30 a.m.
Friday ..	10–30 a.m.	12 noon	7–30 a.m.	9 a.m.
Saturday ..	9 a.m.	10–30 a.m.	6 a.m.	7–30 a.m.

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